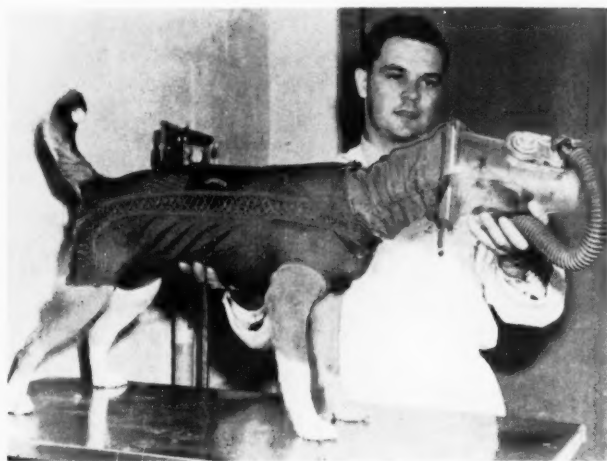


Journal

OF THE
AMERICAN VETERINARY
MEDICAL ASSOCIATION



Veterinarians prepare animals to precede astronauts into space — Page 230



Vol. 136

March 1, 1960

No. 5

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OF THE
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MEDICAL ASSOCIATION

Vol. 136 No. 5 March 1, 1960

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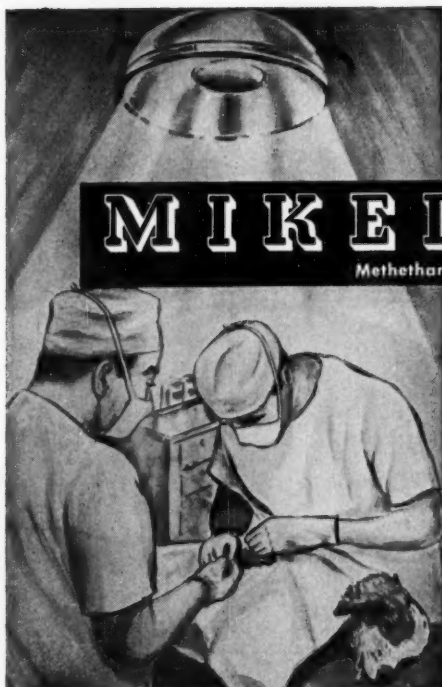
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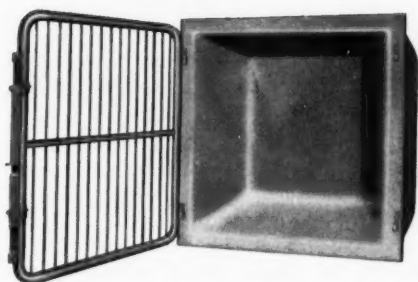
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FROM THE AVMA WASHINGTON OFFICE

J. A. McCallum, VMD
Brig. Gen. USA (Ret.)

LEGISLATIVE

Committees Approve Three Agriculture Bills

The Senate Subcommittee on Agricultural Production, Marketing and Stabilization of Prices, favorably reported bill S.2751 to increase maximum expenditure for the fiscal years 1960 and 1961 under special milk program for children. House Subcommittee on Dairy and Poultry favorably reported a similar bill, H.R. 9331, amended to House Committee on Agriculture. The Senate Subcommittee also will recommend that the full committee urge the Committee on Appropriations to appropriate \$20 million for brucellosis eradication.

House Committee on Judiciary favorably reported the bill H. R. 5789 amended, to incorporate the Agricultural Hall of Fame.

New Social Security Bills Introduced

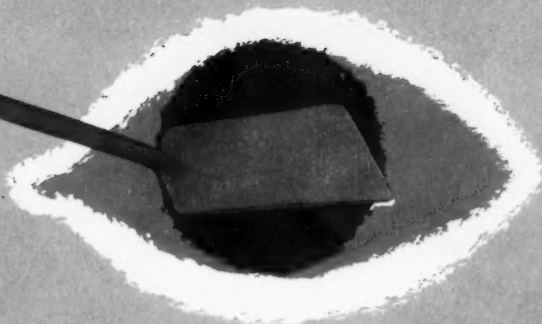
Among the bills to amend Title II of the Social Security Act to permit increased outside earnings without deductions from benefits are H.R. 9588, H.R. 9761, H.R. 9763, by Representatives Riehlman (R., N.Y.), Ashmore (D., S.C.), and Barry (R., N.Y.), respectively, and S. 2793, S. 2809, S. 2866, by Senators Javits (R., N.Y.), Wiley (R., Wis.), and Keating, (R., N.Y.), respectively. Amendments pertaining to "age 50" disability requirements, disability insurance benefits, and disability freeze are H.R. 9596, H.R. 9684, H.R. 9698, H.R. 9743, H.R. 9793, respectively, by Reps. Whitener (D., N.C.), Johnson (D., Wis.), Rhodes (R., Ariz.), Moulder (D., Mo.), and Ullman (D., Ore.), H.R. 9815, Rep. Farbstein (D., N.Y.) would provide benefits for needy individuals over retirement age who are not otherwise entitled to social security benefits under Title II of the Act.

S. 2915, Senators Kennedy (D., Mass.) and Hart (D., Mich.), would provide insurance against costs of hospital, nursing home, home nursing service, and diagnostic outpatient hospital services for those eligible for old-age survivors, and disability insurance benefits. This bill is practically the same as the Forand bill, H.R. 4700, except it omits surgical benefits (see JOURNAL March 15, 1959; adv. p. 16). S. 2879, Sen. Hartke (D., Ind.), would provide a special tax credit against social security taxes to employers who employ persons age 45 or over.

Rep. Kowalski Requests Defense Reorganization

H.R. 9874, Rep. Kowalski (D., Conn.) would reorganize the Department of Defense and provide for administration thereof. Measure calls for complete unification of Army, Navy, and Air Force under a civilian secretary of defense

(continued on adv. p. 10)



Let's call a Spade a Spade

Some problems will solve themselves—on a “Don’t look, maybe it will go away” sort of basis. Others can be swept under the rug.

Unfortunately, the indiscriminate use of veterinary biologics by untrained persons doesn’t fall in either of these categories. It is definitely on the increase, as more and more suppliers are selling through non-professional outlets.

We see this as a detriment to the livestock industry and to your chosen profession. Since we sell only to the graduate veterinarian, we believe your position in this matter is the same as ours.

There is no place in livestock disease control for double talk. It’s time to call a spade a spade. Frankly speaking, it’s pretty much up to all of us as to what—if anything—can be done about this problem.

Muscles that aren’t used atrophy; those that are used increase in size and tone. It is the same way with suppliers of veterinary products . . . and your orders are the only way we have of knowing which side of this issue you’re on.

So the next time you place an order, ask yourself this question: “Could this order help or hurt the future of my profession?”



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WASHINGTON NEWS—Continued

with command authority subject only to the President. This would abolish the joint chiefs of staff, and would create a post of deputy secretary, to be filled by a career military officer. Sen. Symington (D., Mo.) is sponsoring a bill to provide a single chief of staff for the Armed Forces, but would not abolish the separate military services. Among the other provisions of Symington bill are to make service chiefs advisers to the single department chief, to require establishment of unified commands, to abolish the secretaries of military departments and to establish an under-secretary for each of the services, and to increase the authority of Secretary of Defense.

Plan Introduced for Research Program Support

It was reported that Arthur Flemming, Dept. of H&W, will ask Congress for a law authorizing general grants to schools of medicine, dentistry, and public health for support of their research programs. The plan would relieve schools of need to set up specific research projects, thus giving them more freedom. Proposed bill would authorize up to 15 per cent grant moneys.

Georgia Joins Brucellosis-Free States

Georgia qualified as a modified-certified brucellosis free area Dec. 31, 1959, USDA announced Jan. 21, 1960.

USDA Changes Pet Food Label Regulations

USDA announced a change in regulations which permits use of new official inspection seal for the two types pet foods passed for inspection under ARS program. New seal will convey only information that the product was prepared under continuous ARS supervision. However, label must state type of food, i.e., "A Normal Maintenance Pet Feed," or "An Animal Protein Supplement." Information differentiating between the two types is carried elsewhere on label.

Morse Urges Increased Brucellosis Eradication Funds

Regarding brucellosis eradication, Senator Morse, in his address to the Senate Jan. 19, 1960, said the curtailment of federal funds in 1959 hampered the program. He urged the Agricultural Subcommittee on Appropriations to give favorable consideration to increased funds in connection with 1961 budget, and that a supplemental appropriation of \$2.5 million be provided in this fiscal year. Senator Morse pointed out that he was not simply making a plea for funds to eradicate the disease from cattle, but that by means of such eradication, the appropriations are needed in the best interests of the public health. He inserted in the record a letter from Dr. Muth, secretary of the Oregon VMA, and an accompanying resolution from that association urging that adequate funds be provided in the 1961 budget for the brucellosis eradication program.

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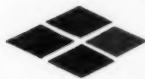
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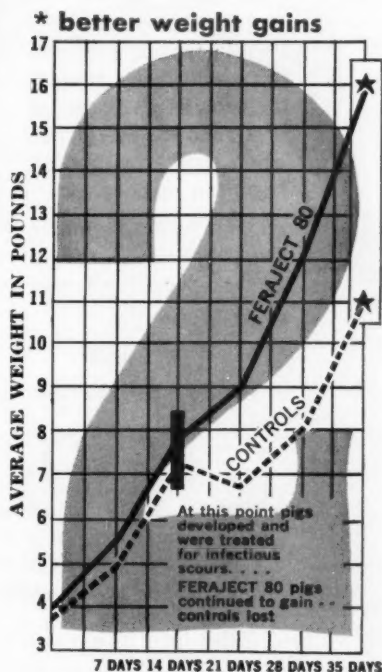
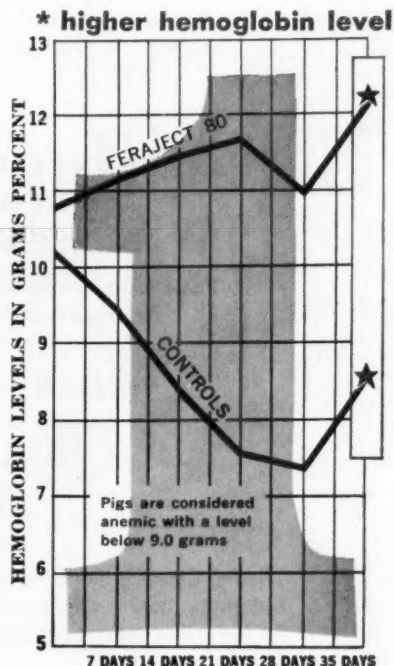
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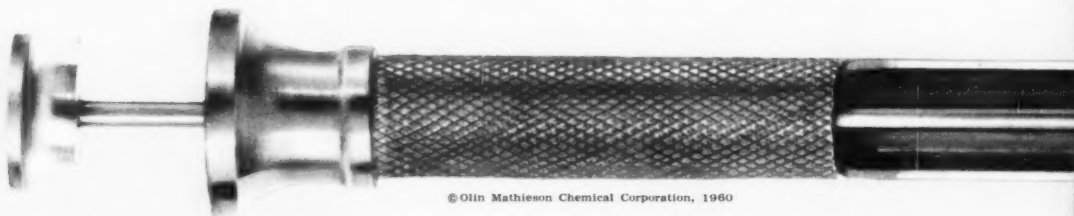
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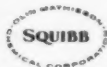


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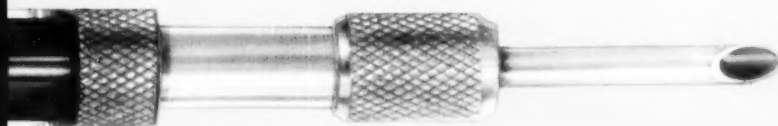
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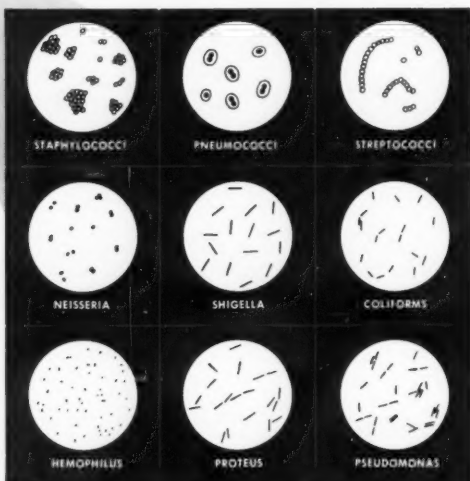
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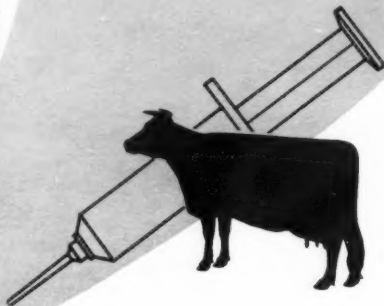
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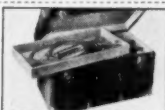
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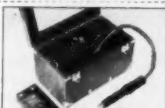
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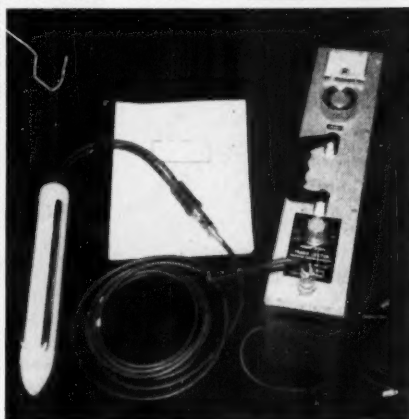
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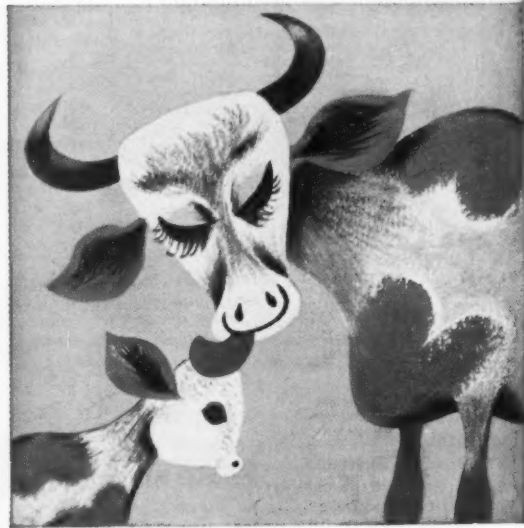
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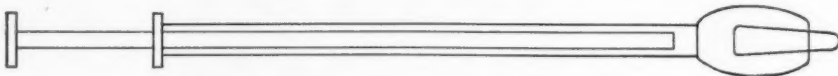
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1. Vigue, R. F., et al.: J. Am. Vet. M. Ass. 134:308 (April 1) 1959.

2. Vigue, R. F.: Personal communication.

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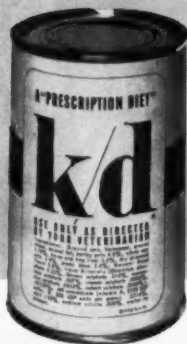
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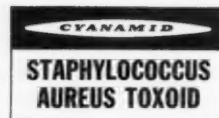
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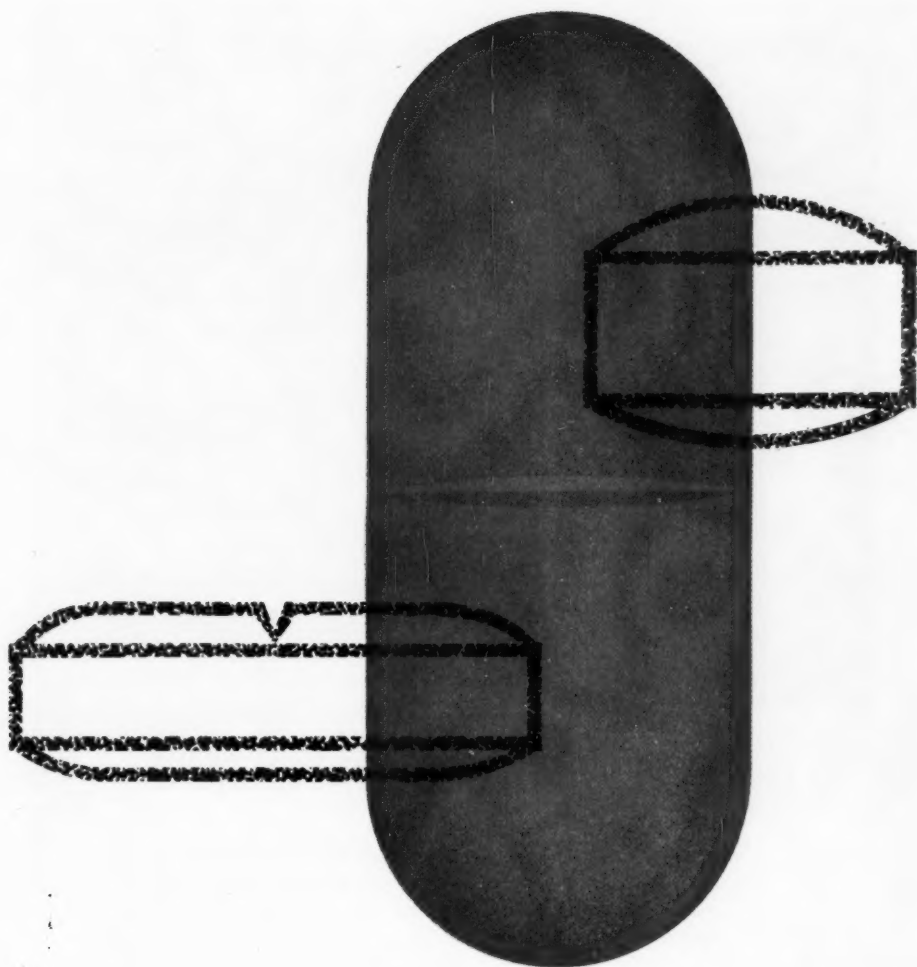
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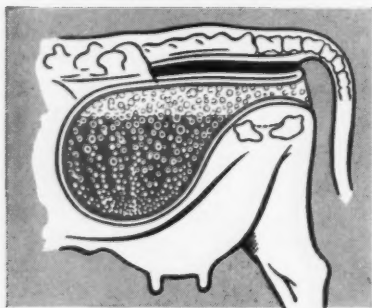
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Interpretation of the

California Mastitis Test Results

on Milk from Individual Mammary Quarters,

Bucket Milk, and Bulk Herd Milk

D. M. GRAY, M.S.

O. W. SCHALM, D.V.M., PH.D.

THE MOST RELIABLE TESTS for mastitic detection are of limited field use because they are time-consuming and require expensive equipment and trained personnel. The strip cup has been used at the side of the cow to indicate clinical mastitis since 1916,² but it is not a critical test and well advanced cases of mastitis go undetected.

The Whiteside test,⁶ first described in 1939, is an accurate method which presumptively measures the cell count in milk. Later the Whiteside test was modified to make it more adaptable to field use.^{3,4} The resazurin reduction test has been used to estimate the mastitis index of milk,¹ although this procedure has been utilized primarily as a presumptive indicator of the bacterial content of milk.

The California Mastitis Test (CMT), developed in 1956, is a rapid, simple, easily read test which, like the Whiteside test, shows a specificity for leukocytes in the milk.⁵ The CMT reagent is nontoxic, has a long shelf-life, and is relatively stable under the conditions of use.

The aim of this report is (a) to show the practical application of the CMT as a rapid field or platform test, or both, for detection of mastitic milk and (b) to evaluate the effect of dilution in bucket or bulk milk on the accuracy of the test. Scores of CMT in relation to mean cell counts in milk and the percentage of cells of the polymorphonuclear leukocyte type have been published.⁵

Material and Methods

To compare CMT reactions in various portions of quarter milk, mixed milk from 4 quarters (bucket milk) and bulk milk, or total production of all glands of 18 Holstein-Friesian cows, were used. Samples were collected monthly over a 10-month period with an average of 14 cows tested per month. A CMT was conducted at the side of the cow, as has been previously described,⁵ on the first streams (foremilk) and again on strippings from each quarter. Prior to milking, 18 ml. of milk from each quarter was drawn into a sterile vial containing 1.0 ml. of 0.32 per cent bromocresol

From the School of Veterinary Medicine, University of California, Davis.

purple (Hotis test sample). The CMT score was determined on this milk before incubation for the Hotis test. Quarter milk samples were obtained through use of a milking machine of special design which withdrew quarter milk into 4 separate containers. The bucket sample was obtained after mixing milk from individual quarters. The bulk milk sample was taken from the tank after all cows had been milked. A total of 568 quarter milk samples, 142 bucket milk samples, and 10 bulk milk samples were given CMT scores. The CMT was also applied to foremilk samples, stripping samples, and Hotis test samples. These data were summarized (table 1).

All milk samples, with the exception of foremilk and strippings, were tested in the laboratory in a 10-cup, white plastic paddle placed on an offset turntable operated by an electric motor. A 2-ml. volume of milk was transferred with an automatic syringe, and 2 ml. of CMT reagent was added by means of another automatic syringe. The CMT score was determined while the milk and reagent were mixed and swirled mechanically.⁵

Milk samples were refrigerated when it was necessary to hold them for more than a few hours before conducting the CMT. Each sample was mixed before removing the 2-ml. portion for testing, and the auto-

TABLE 1—Percentage Distribution of CMT Scores on Different Portions of 568 Quarter Milk* Samples, on 142 Bucket Milk Samples, and on 10 Bulk Milk Samples

Milk sample sources	CMT Score					Positive for mastitis	
	Negative	Trace	1	2	3	Combined 2 and 3 scores	Combined 1, 2, and 3 scores
Foremilk	34.5	6.2	20.0	20.9	18.5	39.4	...
Hotis sample	51.1	4.6	17.7	17.0	9.6	...	44.3
Quarter sample	52.8	7.5	16.0	16.7	7.1	...	39.8
Strippings	37.2	8.6	21.5	18.3	14.4	32.7	...
Bucket sample	47.1	11.4	22.9	18.6	...	...	41.5
Bulk tank sample	...	...	100.0	...	...	...	...

*Foremilk, Hotis sample, quarter sample, and strippings represent different portions of milk from individual quarters of 18 individual cows.

The study was extended to include bulk tank milk samples from 126 commercial herds composed of 87 per cent Holstein-Friesian and 13 per cent Jersey, Guernsey, Ayrshire, and Brown Swiss breeds. All herds were registered in the Dairy Herd Improvement Association. Through cooperation of the DHIA tester, bucket milk samples were received from all lactating cows in each herd on the same day that bulk tank milk samples were collected for application of CMT. In addition, weight of milk produced by each cow for that particular day was available from the DHIA record. Before collecting bulk milk samples, milk contained in the tank was mixed as thoroughly as possible, and samples were taken from 4 to 6 separate areas of the tank. This procedure was necessary because leukocytes are not always evenly distributed in bulk milk. The CMT scores on bucket samples from 8,265 individual cows were compared with bulk milk CMT scores for their respective herds. These data were summarized (table 2).

matic syringe was rinsed in running water before use on the next sample.

Interpretation of CMT on Quarter and Bucket Milk Samples.—Frequency of mastitis incidence by percentage based on 5 CMT scores on different portions of quarter milk, on bucket samples, and on bulk herd milk were tabulated (table 1). In addition, percentage of samples designated as positive for mastitis by interpretation of CMT reaction is shown for each type of milk.

Results and Discussion

It has been common practice with foremilk and strippings to consider CMT scores of "trace" and 1 as suspect for mastitis and CMT scores of 2 and 3 as positive for mastitis. On this basis, 39.4 per cent of foremilk samples and 32.7 per cent of stripping samples were classified as positive. It is conjectured that the greater sensitivity of foremilk to CMT results from leukocytes settling toward the teat, there-

by contributing a higher cell count to the first streams of milk. The leukocyte count of strippings may be similar to that of foremilk⁵ and is greater than that of middle milk. The explanation for this is not as obvious as in the case of foremilk, but it may be related to the close contact of strippings with the tissues from which the leukocytes migrate into the milk. Also, high fat content of strippings may influence retention of leukocytes.

After the foremilk was removed, representative samples of the next 15 to 20 ml. of milk (Hotis test sample) gave a CMT reaction similar to that of total quarter milk. Due to the leukocyte dilution factor in middle milk, it was necessary to include the reactions scored CMT 1 among the milk samples designated positive for mastitis. On this basis, 44.3 per cent of Hotis samples of milk and 39.8 per cent of quarter milk samples were classified as mastitis positive (table 1). These results compare favorably with the 39.4 per cent positive for mastitis indicated by foremilk CMT scores of 2 or 3.

Bucket milk represents possible dilution of mastitic milk with secretions from normal quarters. Because of this dilution, a CMT score of 1 or greater in bucket milk reflects the presence of mastitis in one or more quarters of the udder. Existence of mastitis was indicated in 41.5 per cent of 142 bucket samples of milk obtained from the 18 cows when CMT scores of 1 or greater were designated positive for mastitis.

The bulk tank milk samples were uniformly scored CMT 1 over the 10-month period covered by this study. These results compare favorably with bulk milk studies in commercial herds.

Interpretation of CMT Results on Bulk Herd Milk.—The CMT results on bulk milk from 126 commercial herds including 8,265 cows were summarized (table 2). The CMT reactions in bulk milk were scored in the same way as quarter or bucket sample milks.⁵ Bulk milk was scored as "negative," "trace," 1, 2, or 3. Both maximum and average incidence of mastitic cows present in herds for each bulk milk CMT score were determined. In addition, percentage of total milk produced by mastitic cows as well as percentage loss in average daily milk secretion per cow in more severely affected herds are shown. A cow was classified as mastitic when its bucket milk gave a CMT reaction of 1, 2, or 3.

Percentage incidence of mastitis-positive cows in a herd was usually higher than the percentage figure of the total herd milk that came from such cows. For example, a bulk milk CMT score of 2 was associated with an average of 58.5 per cent CMT positive cows, and milk from these mastitic cows averaged 54.6 per cent of total herd production.

Due to dilution of mastitic milk with milk from normal glands, a tank sample CMT score of "negative" does not imply complete freedom from mastitis. In this survey, herds with bulk milk scores of "negative" showed an average of 17.8 per cent CMT positive cows on bucket milk with a possible maximum of 25 per cent. Use of CMT on bulk herd milk as a screening procedure in milk quality control should not produce a severe hardship on the majority of herd owners if results of the present survey are representative. Among 126 herds in this study, only 16 per cent had bulk milk CMT scores of 2 or 3, 21 per cent

TABLE 2—The CMT Scores on Bulk Herd Milk Compared to Percentage Incidence of Mastitis-Positive Cows* in the Herd and Percentage of Total Milk Produced by Such Cows (Data Compiled on 126 Commercial Herds Including 8,265 Cows)

		Bulk Tank Milk CMT Score				
		Negative	Trace	1	2	3
Percentage distribution of the herds		40.2	22.5	21.4	10.6	5.3
Percentage incidence of mastitis-positive cows	Max.	25.0	36.5	50.7	75.6	97.6
	Av.	17.8	30.7	39.6	58.5	81.6
Percentage of herd milk produced by the mastitic cows	Max.	25.7	33.2	51.7	72.4	87.3
	Av.	15.7	27.2	36.3	54.6	81.0
Average daily lb. milk produced per cow		37.2	35.2	35.0	32.0	29.6
Milk loss, percentage of average production of cows in CMT negative herds		0	5.4	5.9	14.0	20.4

*A CMT score of 1 or greater in bucket milk indicates that sample is positive for mastitis.

scored CMT 1, and 63 per cent produced milk scoring "negative" or "trace."

Bulk milk CMT scores of 2 or 3 indicate a serious mastitis problem and poor quality milk from the point of view of cell content and other products of inflammation. Removal of cows with advanced mastitis from such herds, correction of milking technique, and replacement of malfunctioning milking equipment can result in marked improvement in milk quality within a few weeks; such improvement will be accompanied by increased average milk production per cow. Average daily milk yield per cow in herds with a bulk milk CMT score of "negative" was 37.2 lb. Average production per cow was 14.0 per cent less when bulk milk scored CMT 2 and 20.4 per cent less when the score was CMT 3.

Conclusions

1) When foremilk is used for mastitis detection by CMT, a CMT 1 score may be regarded as suspect for mastitis and scores of 2 and 3 as positive.

2) When the first streams of milk are discarded, the next 15 to 20 ml. is representative of the total milk in the quarter insofar as CMT reaction is concerned.

3) When quarter milk or bucket milk is subjected to the CMT, scores 1, 2, or 3 are indicative of mastitis or abnormally high cell-count milk from 1 or more quarters.

4) The CMT is applicable to total herd milk for purposes of estimating percentage incidence of udder irritation and percentage of total herd milk derived from CMT-positive cows.

5) Percentage figures for CMT-positive cows in a herd are usually higher than average percentages of total milk produced by CMT-positive cows.

6) Use of CMT on bulk herd milk for detection of herds having high incidence of mastitis should not decimate the herds of a milkshed. Due to the dilution factor in bulk milk, a CMT score of "negative" tolerates up to 25 per cent CMT-positive cows in the herd with an average of 18 per cent CMT-positive cows.

7) Herds with bulk milk CMT scores of 2 or 3 have a serious mastitis problem. Correction of the problem along with reduction of bulk milk CMT score to "negative" could lead to an increase of 14 to 20 per cent in production, as well as significant improvement in quality of milk.

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Penicillin Available in England Only from Veterinarians

Milk from a cow treated with antibiotics less than 48 hours previously shall not be delivered to the Milk Marketing Board in England. This is a new clause added to the contract between producers and the Board and took effect November 1 to counteract the rising, serious problem of antibiotic contamination of milk. In Britain, penicillin is supplied only on a veterinary surgeon's prescription.—*Vet. Rec.*, 71, (1959): 850.

New Test for Antibiotics in Milk

A new test using 2,3,5-triphenyltetrazolium chloride (TTC) has been developed for detecting antibiotics, chemicals, or other contaminants which inhibit bacterial growth in milk.

Antibiotics present in milk prevent curdling necessary to cheese making, can cause allergic reactions in human beings, and can invalidate some standard quality tests.

Treatment for mastitis is the usual source of antibiotics in milk. Milk from one treated quarter taken 36 hours after treatment can contaminate the milk from 5 normal cows when mixed.

Manufacturers could use a chemical dye which would color milk still carrying antibiotic ointments; however, failure to de-

velop such a check makes testing necessary.

The new test takes $2\frac{1}{2}$ hours as compared with the minimum 4 hours required by older tests. Standard milk-testing equipment is used.

The method of testing involves a small sample of raw milk put into a test tube, pasteurized, and cooled. A starter culture is added, and the sample is kept warm for two hours. A small amount of TTC is added, and the mixture is kept warm for an additional 30 minutes.

A red color sample indicates clean milk. Milk contaminated with inhibiting substances remains white. Varying shades of red indicate amounts of contaminants.—*Wisconsin Agric.*, 86, (Nov. 21, 1959): 16.

Effects of Chlortetracycline in . . .

. . . Dairy Calves

An intake of 250 mg. of chlortetracycline for the first three days of life was as effective as higher levels in reducing enteritis and mortality. The three-day antibiotic treatment did not affect growth to 16 weeks of age. Feeding daily from 4 days of

age, 50 mg. of chlortetracycline significantly increased growth of 16 weeks of age with a concurrent increase in feed consumption and in feed efficiency.—*Frontiers in Nutr., Suppl. Tech. Ed.*, 77, (1959): 615.

. . . Dairy Cattle

Chlortetracycline was fed to lactating dairy cows at levels of 0.1, 0.5, and 1.0 mg. per pound of body weight per day for a period of two weeks. The two higher levels depressed appetites slightly shortly after the test started, although feed consumption returned to normal after a brief period of

adjustment. During the time of depressed appetite, milk production was also reduced, but production followed the same trend as appetite. Chlortetracycline was found in the milk from the cows on the two higher levels.—*Frontiers in Nutr. Suppl. Tech. Ed.*, 77, (1959): 617.

. . . Hogs

Pigs were fed four different protein levels from weaning to market with reduction in each at 70 lb. and 130 lb. live weight. The lowest level ranged from 13 per cent protein at weaning to 11 per cent from 130 to 200 lb. and the highest from 19 per cent at weaning to 13 per cent of 130 lb. Addition of chlortetracycline significantly increased the rate of gain at all protein levels.

The lowest protein ration with chlortet-

racycline supported performance equal to the highest protein level without chlortetracycline. Antibiotic improved feed efficiency at all protein levels whereas protein level had no significant effect on feed efficiency of the feeding period as a whole. The protein-antibiotic interaction on rate of gain was significant as was the protein-antibiotic interaction on feed consumption.—*Frontiers in Nutr. Suppl. Tech. Ed.*, 77, (1959): 604.

Lungworm Infections in Calves

M. I. DJAFAR, D.V.M.
L. E. SWANSON, D.V.M.
R. B. BECKER, PH.D.

Numerous observations on the clinical^{1,3-6,9-11} and hematologic^{6,12,13} manifestations of lungworm disease in cattle have been reported. However, none of these investigators have reported detailed clinical signs, complete hematologic examinations, and serum protein analysis in pure lungworm infections in the same calves under carefully controlled conditions. It is the purpose of this manuscript to report these data.

Materials and Methods

In these studies, 18 cross-bred calves were used. They were obtained at 3 days of age, housed in dirt-floored pens, and bottle fed a commercial milk replacer.¹⁰ They remained free of helminths. They were allotted at random to 3 groups of 6 each. Two animals in each group served as controls and the rest as principals.

First-stage lungworm larvae were obtained from feces of infected calves by the modified Baermann technique. The larvae were allowed to develop to the third or infective stage in Petri dishes containing water at 17 to 20 C.¹⁰

The calves were inoculated orally at 3 to 4 months of age with 10,000 to 20,000 larvae for 3 to 4 consecutive days until a total dose of 40,000 or 50,000 larvae per calf had been given. All calves in a particular group were given the same number of larvae from the same source.

Clinical examinations were conducted twice weekly on all principals and once weekly on the controls. Fecal examinations were conducted week-

ly from postinoculation day (PI day) 18 until necropsy.

Hematologic examinations were conducted at weekly intervals for 4 weeks before infection and for the entire experimental period. Blood was obtained from a jugular vein, and all specimens were collected at the same time of day. Care was taken not to excite the calves unduly before bleeding.

Total erythrocyte and leukocyte counts were made from heparinized blood. Differential leukocyte counts were made from fresh blood smears stained with Wright's stain. The hematocrit value was determined by centrifugation at approximately 700 g. for 40 minutes using Wintrobe tubes. Hemoglobin was determined using Drabkin's cyanmethemoglobin method and a Beckman "spectronic 20." The serum proteins were separated by the Spinco model R paper electrophoresis apparatus using veronal buffer at pH 8.6 and an ionic strength of 0.075. The strips were stained with bromphenol blue and evaluated by the Spinco analytrol recording scanner and integrator.

Results

Clinical Observations.—The uninoculated controls remained healthy and made normal weight gains during the entire experiment.

The inoculated calves appeared normal and made satisfactory weight gains during the first 2 weeks following infection. Occasional dry, nonproductive coughing was first observed on PI day 10. On day 12, respiratory rates became accelerated and abdominal in character. By day 14, respiratory rates were significantly increased, marked expiratory dyspnea occurred, and large, medium, and small moist râles were present on inspiration. Tactile fremitus was noted on palpation, but no alterations could be detected by percussion

From the Department of Veterinary Science (Djafar, Swanson) and the Department of Dairy Science (Becker), University of Florida, Gainesville. Florida Agricultural Experiment Stations Journal series, No. 1002.

These data were submitted, in part, to the Graduate School by the senior author in partial fulfillment of the requirements for the M.S. degree.

TABLE 1—Mean Hematological Values of 18 Normal Experimental Calves Prior to Infection

Blood components	Value	Expressed as
Erythrocytes	8.75 ± 0.21	per cmm. blood 10 ⁶
Leukocytes	8.09 ± 0.25	per cmm. blood 10 ³
Hematocrit value	40.19 ± 0.46	in per cent
Hemoglobin	10.99 ± 0.2	in Gm./100 ml. blood
M.C.V.*	0.46 ± 0.27	in cu. micron
M.C.H.C.*	0.29 ± 0.21	in Gm./100 cc. of packed cells
M.C.H.*	12.6 ± 0.31	in µµg.
Neutrophils	26.58 ± 0.55	in per cent
Immature neutrophils	3.78 ± 0.22	in per cent
Eosinophils	1.61 ± 0.13	in per cent
Basophils	0.03 ± 0.009	in per cent
Lymphocytes	62.30 ± 0.55	in per cent
Monocytes	5.88 ± 0.26	in per cent
Albumin	41.55 ± 0.65	in per cent
Alpha globulin	19.66 ± 0.52	in per cent
Beta globulin	18.00 ± 0.51	in per cent
Gamma globulin	20.77 ± 0.508	in per cent

*M.C.V. = mean corpuscular volume; M.C.H.C. = mean corpuscular hemoglobin concentration; M.C.H. = mean corpuscular hemoglobin.

of the thorax. Frequent moist, productive coughing occurred at that time. Mucopurulent exudate occasionally accumulated around the nostrils of affected animals.

An increase in body temperature occurred beginning PI-days 14 to 17. It reached its peak between days 24 and 31. A significant increase in pulse rate occurred concomitant with the pyrexia. All infected animals developed diarrhea.

The crisis was reached between PI days 24 and 28. Calves that eventually recovered made a rapid return to normal. In the 3 fatal cases, the temperature remained high and the pulse rapid until death. Those animals developed a markedly fetid diarrhea and became depressed. Their conjunctival mucosae were hyperemic. During the last days of life, they stood with their heads extended and lowered, mouths open, and tongues protruding. They gradually became weaker until they could no longer stand. They laid on their sternums with

their jaws resting on the ground and exhibited marked respiratory distress. The calves died 22 (No. 41), 29 (No. 24), and 32 (No. 20) days after infection.

The prepatent period varied from 23 to 25 days. The highest larvae count was 1,510/Gm. of feces in 1 surviving calf 38 days postinoculation. The 3 calves that died did not have high fecal larvae counts, presumably because they did not eat or drink and consequently passed few feces. At necropsy, 2 of the 3 calves with fatal infections had 1,712 (No. 20) and 3,125 (No. 24) mature worms, while the other (No. 41) had 2,455 immature worms in its lungs.

The calves given 50,000 third-stage larvae lost an average of 5.2 lb. per week, those given 40,000 gained 2.8 lb., while the controls gained 7.3 lb. per week.

The calves that died were necropsied. Pathologic changes were identical with those already reported.⁷

Hematologic observations.—No significant changes were observed in any calves during the preinfection period (table 1). No significant changes were detected in controls during the entire experiment.

No significant changes were recorded in total number of erythrocytes, hemoglobin, hematocrit values, mean corpuscular volume, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration, immature neutrophils, basophils, monocytes, or alpha globulin in the principals during the entire study.

In animals that survived infection, there was a significant decrease in total leukocytes on PI days 3 and 7 (fig. 1). An increase in eosinophils began on PI day 10 and was highly significant after PI day 35 (fig. 2). An increase in neutrophils occurred between PI days 10 and 14 which was significant at the 5 per cent level (fig. 3). However, there was a significant decrease in neutrophils between PI days 17

TABLE 2—Hematocrit Values, Hemoglobin, Erythrocytes, M.C.V., M.C.H.C., and M.C.H. Values of *Dictyocaulus viviparus*-Infected and Control Calves

Post-inoculation day (No.)	Hematocrit value (in %)		Hemoglobin (in Gm./100 ml.)		Erythrocytes (in millions)		M.C.V. (in µ)		M.C.H.C. (in Gm./100 cc. of packed cells)		M.C.H. (in µµg.)	
	Infected	Control	Infected	Control	Infected	Control	Infected	Control	Infected	Control	Infected	Control
7	33.3	34.8	9.9	9.8	8.15	8.11	41.1	42.2	30.2	28.9	11.0	11.5
14	35.3	34.5	10.5	9.8	8.32	7.23	42.6	44.1	29.3	28.5	12.7	12.2
21	37.1	35.0	10.3	10.1	8.60	8.35	43.8	44.1	28.7	29.2	12.1	12.4
28	36.1	34.5	10.6	10.3	8.02	7.23	44.2	44.8	29.9	31.0	13.0	14.2

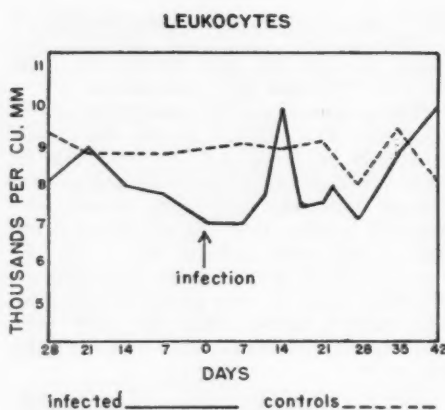


Fig. 1—Changes in the leukocyte counts of calves infected with the cattle lungworm *Dictyocaulus viviparus* (Bloch) and controls.

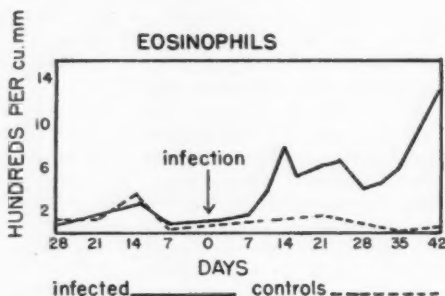


Fig. 2—Changes in the eosinophil counts of calves infected with the cattle lungworm *Dictyocaulus viviparus* (Bloch) and controls.

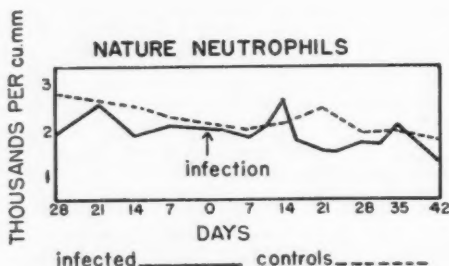


Fig. 3—Changes in the mature neutrophil counts of calves infected with the cattle lungworm *Dictyocaulus viviparus* (Bloch) and controls.

and 28. A significant decrease in lymphocytes occurred on PI days 3 and 7; however, after this time they remained normal (fig. 4). A significant decrease in albumin began on PI day 21. It was highly significant after PI day 28 (fig. 5). A decrease in *beta* globulin occurred soon after inoculation; however, after the first week it remained normal (fig. 6). *Gamma* globulin increased soon after inoculation; it was significantly increased on PI day 17, was highly significant beginning with PI day 28, and reached its peak on PI day 35 (fig. 7).

Calves that died from lungworm infection had strikingly different responses. There were no significant changes in eosinophils, neutrophils, and lymphocytes. A slight decrease occurred in the serum albumin during PI weeks 3 and 4. A significant decrease occurred in the *beta* globulin on the first week and a low response in the *gamma* globulin fraction occurred during PI week 4.

Discussion

Anemia and severe diarrhea have been described as cardinal signs of lungworm disease.⁴ In these studies with pure infections, however, anemia did not occur (table 2), and marked diarrhea was present only in calves that died from this disease.

The significant decrease in total leukocytes during the first week of infection may have been caused by mobilization of

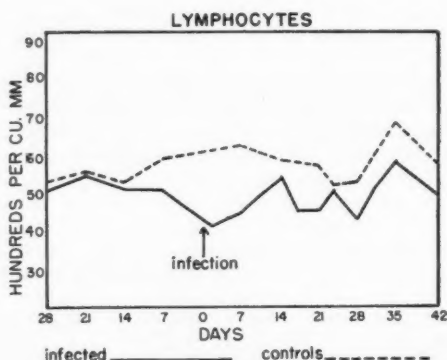


Fig. 4—Changes in the lymphocyte counts of calves infected with the cattle lungworm *Dictyocaulus viviparus* (Bloch) and controls.

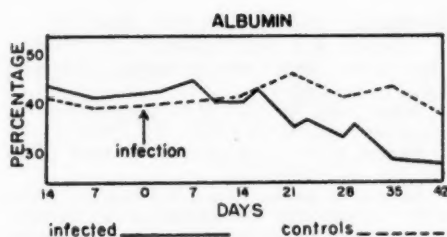


Fig. 5—Changes in the albumin percentage of calves serum infected with the cattle lungworm *Dictyocaulus viviparus* (Bloch) and controls.

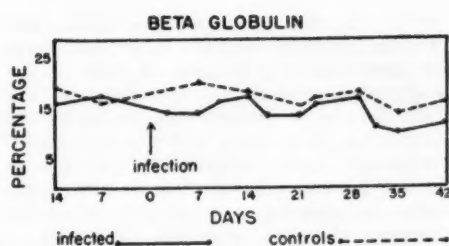


Fig. 6—Changes in the beta globulin percentage of calves infected with the cattle lungworm *Dictyocaulus viviparus* (Bloch) and controls.

leukocytes to the lung tissue as a result of arrival of larvae there. In these studies, a significant increase in eosinophils was noted which reached a peak during PI week 4. Although early eosinophil responses occurred in these animals, the later response was always greater, which is somewhat different from results reported by others.^{12,13} Changes in circulating neutrophils and lymphocytes are good indications of the early defense against the larvae.

The increase in *gamma* globulin appeared to be the characteristic serum alteration in this disease. The proportion of *gamma* globulin reached a peak during PI week 5. It is doubtful, however, that the time of this peak indicates the source of the antigen; i.e., mature worms in the lungs, migrating larvae, etc., that induced the production of *gamma* globulin which presumably was composed of antibodies.²

This study revealed a striking difference in blood changes of calves not fatally infected as compared with those that died from lungworm infection (fig. 8). In the nonfatal cases, there was a rapid increase in serum *gamma* globulin which began shortly after infection. In the fatal cases, there was a delay in the rise of serum *gamma* globulin until about PI day 14. A marked and persistent eosinophilia occurred beginning with PI day 7 in nonfatal cases, while only moderate eosinophilia occurred in calves that died.

Clinical signs were most marked in calves that died. Although the number of signs in the fatal group was small, a tentative conclusion can be drawn that calves

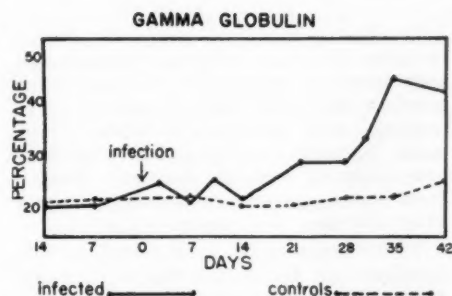


Fig. 7—Changes in the gamma globulin percentage of calves infected with the cattle lungworm *Dictyocaulus viviparus* (Bloch) and controls.

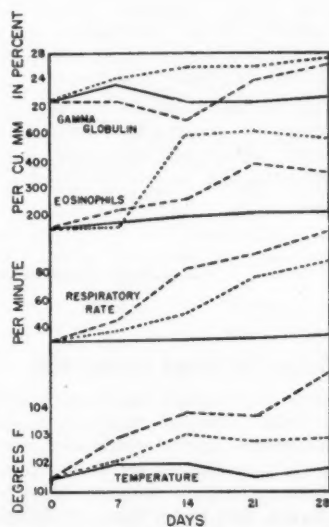


Fig. 8—Different responses in fatal and nonfatal cases of calves infected with the cattle lungworm *Dictyocaulus viviparus* (Bloch).

which do not show an eosinophil and *gamma* globulin response in 10 days have an unfavorable prognosis. A rise in the eosinophil count during the course of any infection, as a general rule, indicates the beginning of recovery and presages an increasingly good prognosis.⁸ The use of eosinophil and *gamma* globulin determinations in making a prognosis is recommended. However, economic factors probably will limit its use to a few animals of high value.

Summary and Conclusions

1) Clinical signs of lungworm disease in calves with pure infections were: coughing; increased respiratory rates with expiratory dyspnea; tactile fremitus; large, medium, and small, moist râles; serous nasal discharge; pyrexia; increased pulse rate; loss of weight; diarrhea; and, in fatal cases, severe respiratory distress, fetid diarrhea, and extreme weakness.

2) No alterations were found in total erythrocytes, hematocrit values, hemoglobin, immature neutrophils, basophils, monocytes, or *alpha* globulin during the course of infection.

3) In calves that survived the infections, there were significant increases in *gamma* globulin which began shortly after oral inoculation with infective larvae and reached their peak on postinoculation day 35. There also was a significant eosinophilia in calves with nonfatal infections.

4) In calves that died, there was a moderate increase in *gamma* globulin that was delayed until after postinoculation day 14. These animals had a low eosinophil response.

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Pond Scum Poisons Livestock

Poisoning of livestock has been traced to an endotoxin released when blue-green algae decompose in scum-covered water. Quick death is caused by small doses. Blue-green algae cells, or microcystis, have been mass-cultured and were toxic when given orally to sheep, calves, and smaller animals.

Research proved the endotoxin to be a toxic peptide that is quite stable.

A slow-death factor caused by 1 of 5 bacteria associated with the blue-green algae was also identified.—*Sci. News Letter*, 76, (1959): 133.

Silage Feeding and Listeriosis

M. L. GRAY, PH.D.

A RELATIONSHIP between silage feeding and listeric encephalitis in ruminants has been mentioned often during the 2 decades since it was first suggested.¹⁴ As early as 1922, an investigator in Iceland warned against risk of a disease, now known to be listeriosis, following silage feeding.²¹ Today in Iceland this relationship is so striking that listeriosis is known as "votheysveiki," or silage sickness,²⁰⁻²² and may be manifested by either encephalitis or abortion.^{20,22} However, several attempts to establish such an association have failed.^{4,15} Recently other workers also reported listeric abortion in cows from 1 to several weeks following corn silage feeding.^{2,26} In one instance in eastern Montana during the spring of 1957, 6 cows died and 21 aborted.²⁶ A similar epizootic of bovine abortion following corn silage feeding was observed again in the same general area in spring of 1958. Symptoms of depression were first observed 4 days after silage was fed. During the next 2 weeks, 3 cows died and 4 aborted. *Listeria monocytogenes* was isolated from 2 fetuses submitted for examination.

This paper reports isolation of *L. monocytogenes* from mice fed "poor-quality" silage thought to be responsible for the abortions.

Experimental Procedures

A silage sample designated "poor" was taken from the top of a silage pit. It was

somewhat moldy and, according to the owner, this was the type silage first given to some of the cows which aborted. Some cows refused to eat it while others ate large quantities of it.

The poor silage and "good" silage from deeper in the pit were fed to groups of 10 pregnant and 10 nonpregnant mice. The 2 grades of silage were also fed to 2 additional groups of 10 mice, 5 pregnant and 5 nonpregnant in each group, which were given *L. monocytogenes* in their drinking water. Although all the mice seemed to eat the silage well, many in all 6 groups showed labored respiration, incoordination, and loss of equilibrium after 2 to 4 days; and between postexposure days 3 and 7, most either died or were comatose.

Apparently full-term, living litters born to 2 mice which received both silage and culture in their drinking water showed no evidence of listeric infection. None of the pregnant mice in any group aborted. There was no obvious difference between mice which received silage only and those which received silage plus *L. monocytogenes*. At necropsy, the livers, spleens, and occasionally the lungs of some mice which received both silage and *L. monocytogenes* showed small necrotic foci characteristic for listeric septicemia. Detectable gross lesions were not observed in any mice which received silage only.

Livers, spleens, and uterine contents of all dead mice, or those killed when comatose, were cultured by macerating tissue in a few milliliters of sterile distilled water and streaking several loopfuls of the resulting suspension on tryptose agar plates. Tissue suspensions were stored at 4 C.^{3,7,8} After incubation at 37 C. for 18 to 24 hours, the plates were examined with a binocular scanning microscope, using obliquely transmitted light. By this

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The author thanks Dr. G. C. Halver, deputy state veterinarian, Helena, for his cooperation in obtaining the aborted fetuses and silage for this study.

method, colonies of *L. monocytogenes* can be identified easily by their characteristic blue-green color and finely textured surface.⁷ Tissue suspensions which failed to reveal *L. monocytogenes* on primary culture were replated at intervals. The bacterium was recovered on primary culture from all but 2 artificially infected mice, and 1 of these yielded *L. monocytogenes* after several days' refrigeration.

Listeria monocytogenes was not recovered from primary cultures of mice which received silage only. However, after 7 weeks of refrigeration, *L. monocytogenes* was isolated from the liver of a nonpregnant mouse and, after 9 weeks, from fetuses of a pregnant mouse, both of which received poor silage only. Both cultures isolated produced marked purulent conjunctivitis and keratitis when instilled in the conjunctival sac of rabbits. Rabbits exposed intravenously to these cultures showed a rise in number of circulating monocytes and died during postexposure day 3.

Serologically, both cultures were type 1,^{*} the same type as isolated from the 2 aborted bovine fetuses. The culture which had been added to drinking water was type 4b, and this was the only type isolated from artificially infected mice. *Listeria monocytogenes* was not isolated from any mice which received only good silage. Since, in some 60 attempts, *L. monocytogenes* has never been isolated previously from this mouse colony and since both cultures were type 1, observations strongly suggest that the poor silage contained *L. monocytogenes* in sufficient numbers to establish infection in exposed mice. However, its presence could be detected only after the viscera had been macerated and refrigerated for a relatively long time.

Discussion

Although it is admitted that presence of *L. monocytogenes* in poor silage is based on indirect evidence, it is felt to be a valid conclusion. Use of small laboratory animals as a culture medium is used widely in attempts to isolate such bacteria as *Leptospira* sp. and *Pasteurella tularensis*. In several studies on distribution of *Past.*

tularensis among feral animals, inoculated animals have died from listeric septicemia.^{1,12,18} The usual conclusion is that inoculated tissue emulsion contained *L. monocytogenes*. By employment of this method, the presence of *L. monocytogenes* has been established in several different species of apparently normal feral rodents^{1,12,18} and Ixodes ticks.^{12,18} On this basis, it seems likely that the presence of *L. monocytogenes* could be detected also in material fed to a susceptible laboratory animal such as the mouse.

Further support of the conclusion that cultures isolated from the 2 mice originated in the silage is the fact that *L. monocytogenes* has never been isolated previously from any other mice in this colony although the same culture methods were applied. That a similar culture may have been dispersed through the silage and actually may have been responsible for the bovine abortions is supported by the fact that, serologically, both cultures were type 1, the same type as that isolated from the bovine fetuses. In contrast, only type 4b cultures were isolated from the artificially infected mice. The culture of *L. monocytogenes* isolated previously from an aborted bovine fetus in this same area was also type 1.^{**26}

Although findings strongly suggest that poor silage may have contained *L. monocytogenes* in sufficient numbers to initiate abortion in cattle, they do not imply that every instance of listeric infection following silage feeding results from ingestion of the bacterium. A preponderance of evidence suggests that, in listeric encephalitis of ruminants, actual exposure is by way of the upper respiratory tract^{16,17,22,23} while oral exposure results in abortion in pregnant animals but not encephalitis.^{23,24} It may be that pathogenesis of the 2 manifestations of infection are different; this has been supported experimentally in rabbits, sheep, and goats.^{5,6,23}

Recently a nonbacterial Listeriosis-enhancing agent (LEA) has been demonstrated in the blood of sheep with high temperatures, in infected flocks, and in lymph nodes and blood from cattle with bovine mucosal disease.^{16,17} Intranasal exposure of sheep with a combination of LEA and *L. monocytogenes* resulted in listeric encephalitis in more than 80 per cent of

*Typing confirmed by Dr. H. P. R. Seeliger, Hygiene Institute, University of Bonn, Germany.

**Typed by Dr. J. Donker-Voet, Rijks University, Utrecht, Netherlands.

the exposed animals. The exact nature of LEA remains obscure. However, it is conceivable that silage may also exert a similar enhancing effect, at least in listeric encephalitis in ruminants. It is also possible that the presence of *L. monocytogenes* in the silage may have been coincidental and played no part in the abortions.

It has often been suggested that *L. monocytogenes* is a saprophyte or soil organism, and it was isolated recently from spring water.¹⁹ There is also strong evidence suggesting that many apparently normal domestic and feral animals may be carriers of the bacterium and may shed it in normal body discharges.^{23,24} In this way, any of the susceptible small feral animals could contaminate silage pits.

Present inadequate methods of reporting animal diseases throughout the world make it difficult to establish the true incidence of listeric infection in ruminants. However, a review of the subject suggests that the highest incidence occurs in countries where silage is commonly fed.^{9,24} In the Netherlands, where silage is fed almost exclusively, *L. monocytogenes* was isolated from 52 aborted bovine fetuses between 1952 and 1957.²³ Recently 59 fetal isolations and 14 isolations from the brains of cattle, sheep, and goats during a 1-year period were reported.¹¹ In Iceland and Norway, where silage is used extensively, listeriosis is considered one of the most serious bacterial infections of sheep.^{10,20-22}

Published reports, including 2,106 case records compiled by the Communicable Disease Center, U. S. Public Health Service, and the sources of cultures submitted to this laboratory for serologic typing, indicate that the disease is more common in the midwestern United States or other areas where silage is used than where little or no silage is used.^{9,25} As far as is known, listeriosis occurs in Montana only in the eastern portion where silage is used as feed.

Present study also re-emphasizes the inadequacies of our present methods for isolation of *L. monocytogenes* from infected material. Although it is true that the bacterium grows well on most commonly employed bacterial mediums, it is not true that it always can be isolated easily. It has been demonstrated repeatedly with tissues and body fluids from both animal and human origin that refrigeration of suspicious material enhances the probability of iso-

lating the bacterium.^{3,6,7,23,24} A diagnosis of listeric infection cannot be eliminated merely by failure to isolate *L. monocytogenes* on initial culture attempts. Disadvantages of the long delay in confirming a diagnosis are obvious.

In the Soviet Union, the inoculation of mice or guinea pigs with suspicious material to obtain a diagnosis is used almost exclusively.^{12,18} This method has been used occasionally in this country, and recently it was reported to be highly effective for isolating the bacterium from brains of cattle with listeric encephalitis.¹³ This technique, or inoculation of embryonating chicken eggs,⁸ may prove to be more effective for demonstrating the presence of *L. monocytogenes* than nonliving mediums and should be further investigated.

Although observations presented here suggest a possible link between silage feeding and listeriosis, there is need for further study to confirm this relationship.

Summary

Listeria monocytogenes was isolated from the viscera of a nonpregnant mouse and the fetuses of a pregnant mouse fed poor-grade silage thought to have initiated death and abortion in range cattle. Serologically, the cultures isolated from the mice were *L. monocytogenes* type 1, the same as that isolated from the bovine fetuses. This study implies apparent relationship between silage feeding and listeriosis.

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Ornithosis Reservoir in Wisconsin and Minnesota

A large reservoir of low virulence ornithosis present in Wisconsin and Minnesota turkeys made it possible to establish a clear epidemiologic pattern. By late 1959, 17 cases of human ornithosis due to contact with infected turkeys had been confirmed in the area, 10 of them during 1956. The latter were serologically confirmed during a 4-month period in which serologic findings indicated an additional number of inapparent infections.

Apparently healthy turkeys harbored the virus which was transmitted during processing. Studies of 987 shipments from 300 farms indicated that plant workers could have been exposed to a quarter of a million potentially infected turkeys during the 4 months corresponding to the human epidemic.

The Wisconsin and Minnesota strains are not a health hazard to housewives preparing infected turkeys for cooking. Subclinical infections among workers come from frequent and repeated exposure to the turkeys which, alive or dead, transmit virus particles through the air.—*Lab World*, 10, (1959): 876.

Controlling Antibiotic Contamination of Market Milk in Sweden

These excerpts from Circular No. 53 (Nov. 10, 1950) of the Royal Veterinary Administration of Sweden show how this country was able to solve its problem of antibiotic contamination of milk through legislation. This same problem now looms large in the United States.

The motivating force for this legislation was the Swedish National Dairy Association, which represents the dairy processors. In the United States, the principal motivating forces are the American Medical Association (because of their concern with sensitivity reactions in man due to penicillin-contaminated milk) and the Food and Drug Administration.

"It has been observed that milk from penicillin-treated cows contained, some time after being delivered to the dairy processing plant, penicillin in concentrations high enough to be detrimental to the production of butter and, especially, cheese, owing to the property of penicillin to inhibit acid fermentation. It is, therefore, of considerable commercial importance to the dairy industry to prevent penicillin-containing milk from becoming involved in the preparation of dairy products.

"Penicillin disappears from milk relatively rapidly; no matter how penicillin has been administered, its concentration in milk 3 days after the last treatment becomes so low that, for all practical purposes, it will not inhibit acid fermentation.

"To prevent so-called 'penicillin milk' from interfering with preparation of dairy products, the Royal Veterinary Administration, after consultation with the Swedish

National Dairy Association, found it necessary to ascribe as a duty of veterinarians, who had occasion to administer penicillin or other antibiotics in treating mastitis, to report this fact to the dairy plant concerned, thereby enabling the dairy to withhold milk supplied by that farm from the processing of products.

"The Veterinary Administration directs every veterinarian to fill out a form with 2 copies every time he has performed a treatment with penicillin or any other antibiotic on a farm. One of the copies is to be left with the animal's owner who, after completing the required data for the information of the dairy, is to sign the form and then attach it to the milk container to be used for delivery to the dairy. The other copy is to be mailed by the veterinarian to the same dairy.

"All penicillin treatments should be performed by the veterinarian himself, after the cow has undergone clinical investigation. Only in exceptional cases, e.g. when a long distance separates the farm from the veterinarian's residence and his repeated visits would prove expensive, may the subsequent treatment be left to the care of the farmer after the latter has been given necessary instructions by the veterinarian as to how to proceed. The amount of penicillin which may be left with the farmer must not exceed the requirements of the case at hand."

Okay Lay Personnel Practice in California State Institutions

On Oct. 30, 1959, the attorney general of California ruled as follows: "The performance of acts constituting practice of veterinary medicine by state employees in the

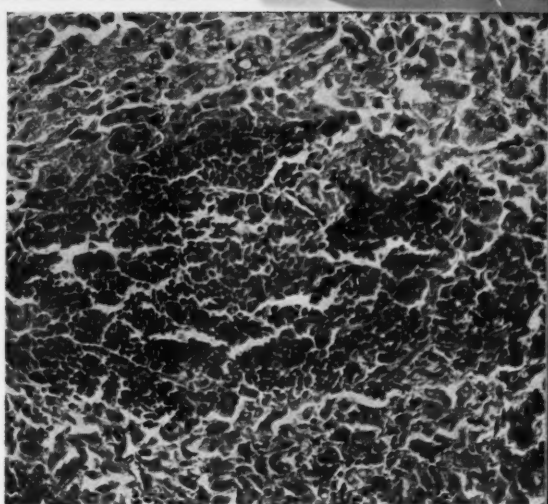
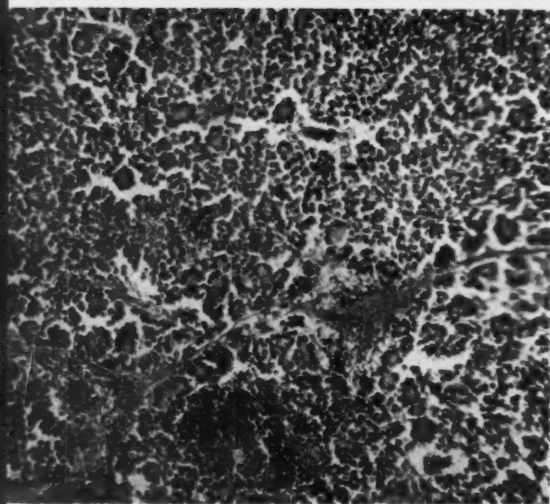
performance of their duties as herdsmen or dairymen at state institutions is not in violation of the Veterinary Practice Act."—*Calif. Vet.*, 13, (Nov.-Dec., 1959): 22.

CMT Equipment Now Available Through Lay Channels

Up to now, California Mastitis Test equipment has been legally distributed only through veterinarians.

Due to certain legal problems and the possibility of encouraging promotion of

inferior substitutes, properly licensed companies are now permitted to market CMT test solution and paddles through lay channels.—*Calif. Vet.*, 13, (Nov.-Dec., 1959): 21.



Two Cases of

Neuroblastomas

in Dogs

Joseph SIMON, D.V.M., Ph.D.
L. T. ALBERT, D.V.M., M.S.

TUMORS of the adrenal medulla,¹ which in man occur primarily in infants and young children, have not been reported in dogs.^{2,4} This report describes cases of neuroblastomas, presumably of adrenal medullary origin, in a 15-year-old male Irish Setter and a 2-year-old male Boxer.

Case 1

History and Clinical Features.—An Irish Setter, whelped in 1940 as the largest in a litter of 11 pups, was in good health. His diet consisted of a dehydrated-type of dog food supplemented with vitamins.

Dr. Simon, formerly with the Department of Veterinary Science, University of Wisconsin, now is at Cancer Research Laboratory, University of Florida, Gainesville. Dr. Albert is with the Animal Care Unit, Medical School, University of Wisconsin, Madison.

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He was struck by a car on Nov. 18, 1953, which resulted in a fracture of the left front leg and extensive head injuries. Recovery from these injuries was uncomplicated. In April, 1954, a swelling of the perianal region was observed. In June, 1954, he had difficulty in walking and limped on the front legs. In July, 1954, a growth, presumably of osseous origin, was found on the left front leg, and the leg was amputated. Histopathologic examination of the growth was not made. The dog recovered from surgery and appeared well for a few months. Finally, food intake diminished, and the dog vomited occasionally. He had difficulty in defecation but, after considerable straining, would pass a normal stool. Tissue masses were palpable in the abdominal cavity. The condition of the dog became progressively worse, and he died on June 9, 1955, at 15 years of age.

Gross Pathology.—The peritoneal cavity contained yellow-brown masses of what

44

Fig. 1 (left, p. 210)—Small dark round cells from abdominal tumor masses from the Irish Setter in case 1, some in sheets and others in rosettes, are shown in this photomicrograph. x 150.

4

Fig. 2 (right, p. 210)—Metastatic foci of a neuroblastoma appear in the liver of the Irish Setter in case 1. x 150.

Fig. 3—Multiple metastatic foci of a neuroblastoma appear in lymphatics (A) and alveolar walls (B) of lung of the Irish Setter in case 1. x 195.

appeared to be necrotic neoplastic tissue adherent to the mesentery and intestine. Similar metastatic foci were observed in the pleural cavity. The foci measured 1 mm. to 4 cm. in diameter. Organs involved included the liver and lungs.

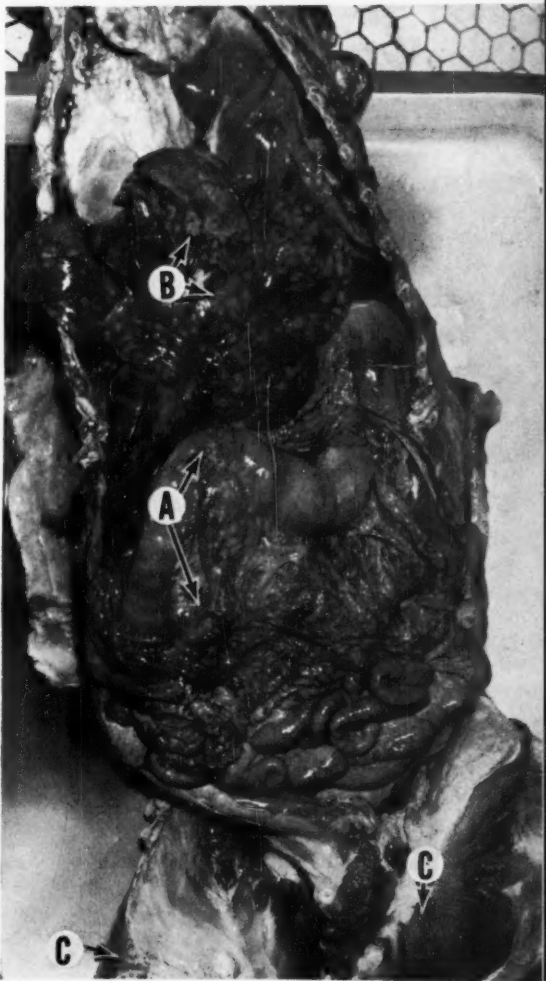
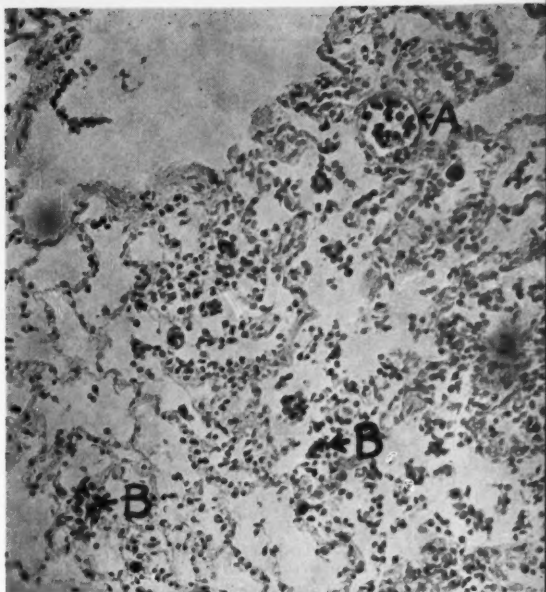
Histopathology.—Tissue masses in the peritoneum were composed of small, dark, round cells which resembled lymphocytes (fig. 1), with an occasional group of cells in circular and rosette arrangement, surrounding an eosinophilic-staining central mass. The majority of neoplastic cells were in sheets. Much tissue had undergone necrosis and hyalinization.

Tumor masses consisting of small, round cells similar to lymphocytes were found in the liver parenchyma (fig. 2) and in the blood and lymphatic vessels. Much of the liver was necrotic. A few rosettes were observed. Neoplastic cells were observed in the larger vessels and lymphatic vessels of the lungs. There was some invasion of the alveolar walls near the lateral margin (fig. 3). Neoplastic cells were not observed in the heart, kidney, and spleen.

Case 2

History and Clinical Features.—The owner of a 2-year-old male Boxer com-

Fig. 4—Opened thoracic and abdominal cavity of the Boxer in case 2 shows visceral adhesions (A), necrotic-hepatic foci (B), and pigmented skin (C). Neuroblastoma was diagnosed.



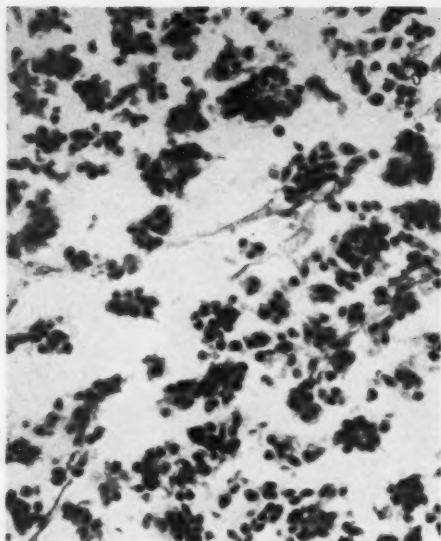


Fig. 5—High power photomicrograph shows lymphocyte-like cells in abdominal tissue of the Boxer in case 2. Neuroblastoma was diagnosed. $\times 300$.

plained that the dog's appetite was not good, and that it had difficulty in defecating. Rectal examination revealed an enlarged prostate, and the dog was treated with stilbestrol to correct the "prostatitis." A vitamin supplement was prescribed. Although the "prostatic lesion" decreased in size, the general condition of the dog be-

came progressively worse. Finally it was euthanatized.

Gross Pathology.—Circumscribed black spots, 2 to 4 mm. in diameter, were observed on the skin (fig. 4) over the elbows, stifle, hock joints, and scrotum. The dog manifested generalized lymphadenopathy with extensive necrosis.

The abdominal cavity contained large masses of tumor tissue which immobilized the viscera (fig. 4). It was impossible to separate the visceral components by dissection; hence, the adrenals were not examined. Numerous necrotic foci 2 to 4 mm. in diameter were observed throughout the friable liver (fig. 4).

The anterior mesenteric lymph nodes were adherent to the thoracic wall. These nodes were approximately 4 cm. in diameter. Small yellowish brown foci, 2 to 4 mm. in diameter, were observed at the lateral border of the lungs.

Histopathology.—Sections taken from one of the tumors near the right kidney revealed a necrotic mass surrounded by a heavy cellular infiltration of cells which resembled lymphocytes (fig. 5). Many of these cells were arranged in a circular pattern surrounding an eosinophilic central mass resulting in a rosette appearance. Small metastatic foci of cells were ob-

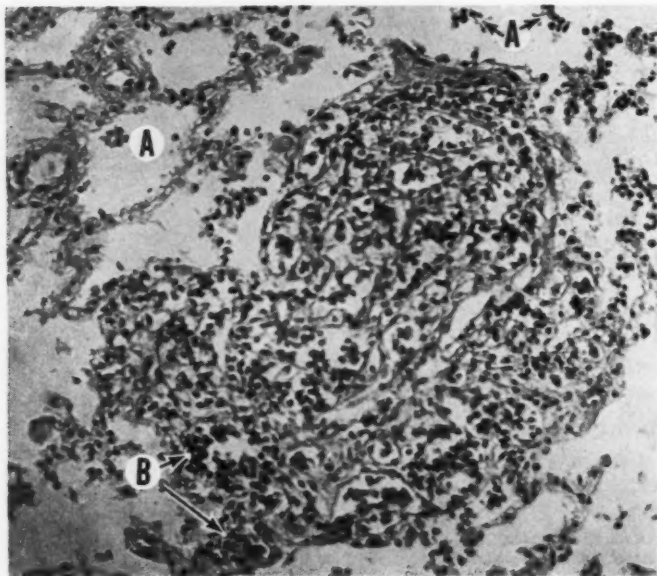


Fig. 6—Metastatic foci of a neuroblastoma in the Boxer in case 2 appear in the alveolar spaces (A) of lung and in the interstitial areas (B). $\times 215$.

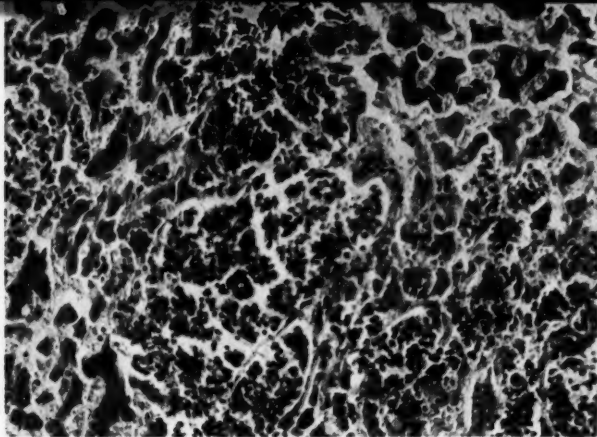


Fig. 7—Metastatic cells in the liver of the Boxer in case 2, diagnosed as a neuroblastoma, show extreme hepatic necrosis. Cells are arranged in sheets and rosette formation. x 150.

Fig. 8—Section through black pigmented spot from skin of leg of the Boxer in case 2. It was diagnosed as a neuroblastoma with extensive metastasis. Note melanin deposit in prickle cell area (A). x 125.

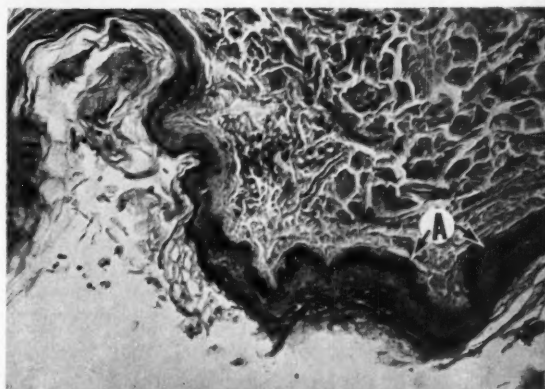
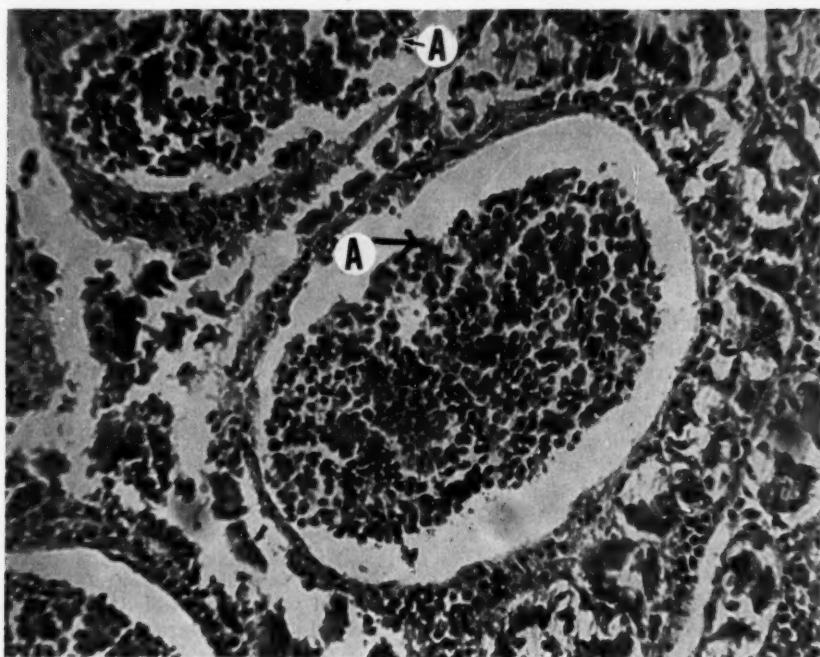


Fig. 9—Islands of closely packed neoplastic cells were found in the larger lymphatic spaces (A) of the thickened rectal wall of the Boxer in case 2, and diagnosed as neuroblastoma cells. x 250.



served primarily at the periphery of the lung (fig. 6). Masses of neoplastic cells were localized in the subendocardial region of the right ventricle of the heart. A few neoplastic cells were observed between muscle bundles of the myocardium. Neoplastic cells were not observed in the kidney or spleen. Extensive necrosis with masses of neoplastic cells were found in the liver; some were in rosettes (fig. 7). The epithelium was flat and thin with an accumulation of melanin in the prickle cell layer in pigmented areas (fig. 8). Neoplastic tissue had invaded the muscularis and mucosal folds of the rectal wall. Islands of closely packed neoplastic cells were found in the lymphatic spaces (fig. 9).

Discussion

Although the clinical data were fairly complete in these 2 cases, a clinical diagnosis of neuroblastoma could not be made. Exploratory laparotomy with subsequent biopsy would have permitted a diagnosis in these cases.

The "osseous tissue" on the amputated leg of the Irish Setter was not available for histologic examination. Therefore, it was impossible to know the nature of this lesion.

Since the prostate regressed following stilbestrol therapy in the Boxer, it could have been erroneously concluded that prostatic hypertrophy (which could account for the difficulty in defecation), was the major ailment.

Perhaps the most significant clinical finding in the Boxer was the dark pigmented spots in the skin of the elbows, stifle, hocks, and scrotum. This abnormal pigmentation of the skin is frequently a clinical feature of Addison's disease in man. Presumably, other destructive lesions of the adrenal gland could cause abnormal depositions of melanin in the skin of dogs. Observation of pigmented spots should lead the clinician to suspect that the adrenal gland might be involved.

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Radioactive Phosphorus in Fracture Repair

To determine the ability of radioactive phosphorus to stimulate callus formation, partial fractures of the radius were produced experimentally in 16 dogs in Yugoslavia. On the dorsal surface of the diaphysis, 2 transverse cuts were made 1 cm. apart, reaching to the middle of the medullary canal; the bone between the cuts was then removed with a chisel.

Following surgery, the 8 principals were given, by injection, 0.75 μ c./kg. of body weight of carrier-free radiophosphorus (P^{32}) as Na_2HPO_4 in sodium chloride solution every 2 days for 30 days.

Radiographically, signs of growth of preosteal tissue and the beginning of ossification could be seen in all of the principals (but in only 1 control) as early as the fourteenth day. The mean repair for the principals was 26 to 29 days; for the controls, 40 to 45 days. There were no significant variations in blood values during the course of the experiment.—J. Gligorijevitch et al. in *Vet. Glasnik*, (1959): 858.

Bladder, Prostate Gland, and Urethra

in the Male Dog

Norma GORDON, M.A., M.V.Sc., M.R.C.V.S.

RECENTLY, PROSTATECTOMY^{2,8} has received increasing favor as a treatment for various diseases of the prostate gland. The intention of this paper is to describe the surgical anatomy of the area and to help the surgeon avoid untoward sequelae.

In the regular surgical approaches to the bladder, prostate gland, and urethra in man, the important nerves to the pelvic organs are so disposed as to be protected naturally from damage.³ The same does not hold for the approaches favored in the dog.^{2,8} The structures are described in the stages in which they are seen by the surgeon making the abdominal approach to the gland.²

Material and Methods

The peritoneal and fascial relations of the bladder, prostate gland, and urethra were studied in 119 dogs by gross dissection and roentgenography, using special techniques followed by serial sagittal sections.

The extrinsic blood supply to the bladder, prostate gland, and urethra was studied in 52 dogs, and the intrinsic blood supply was studied in 32 of these dogs. The methods used were: (1) gross dissection in which the blood vessels had been filled with

an injected mass; (2) roentgenography of dogs in which the arteries had been filled with radiopaque medium;¹⁴ (3) clearing of injected specimens by the Spalteholz technique; (4) preparation of casts of blood vessels; and (5) serial transverse sections of the pelvic and abdominal cavities.

The nerve supply to the bladder, prostate gland, and urethra was studied in a total of 23 dogs by gross dissection and gross dissection together with nerve staining. Two methods of staining were used: Wharton's¹⁵ and Meyling's⁹ modification of Schabadash's¹³ method.

Results

After the abdomen has been opened by the initial midventral incision (fig. 1), the most ventral structure visible in the area of the bladder and prostate gland is an artery of considerable size which arises from either the deep caudal epigastric artery or the pudendo-epigastric trunk. This vessel, which supplies the fat on the ventral surface of the prostate gland and between the layers of the lateral umbilical ligament, ends by anastomosing with the branches of the urogenital artery for which it may be mistaken. The prostate gland is hidden by fat, but the bladder can be seen suspended from each side of the lateral abdominal wall by the lateral umbilical ligaments and from the midventral abdominal wall by the middle umbilical ligament. These ligaments are composed of a double layer of peritoneum. Between the layers of the lateral ligaments are the ureters, blood vessels, nerves, and a considerable deposit of fat. Neither the middle

From the Department of Anatomy, Ontario Veterinary College, Guelph, Ont.

Miss Gordon is now with the Sub-Department of Veterinary Anatomy, University of Cambridge, England.

This paper is taken from a thesis submitted to the University of Toronto in partial fulfillment of the requirement of the M.V.Sc. degree.

The author thanks Drs. J. H. Ballantyne and W. C. D. Hare for their advice and encouragement, and Miss D. M. McCullum for her diagrams.

umbilical ligament nor the ventral layer of the lateral umbilical ligament extends caudad past the neck of the bladder in the adult dog, because the vast quantities of fat that cover the ventral and lateral faces of the prostate limit the extension of the paravesical fossa into the caudal part of the abdomen and the pelvic cavity.

When the surgeon has pulled the bladder craniad, these ventrocaudal limits of the peritoneal cavity can be seen more clearly. After the fat covering the ventral face of the prostate gland has been removed, the suspension, blood, and nerve supply of both the prostate and bladder can be observed. The prostate is suspended laterally by a single layer of peritoneum, which is the caudal extension of the dorsal layer of the lateral umbilical ligament. This layer joins with its counterpart of the opposite side on the dorsal surface of the prostate to give the prostate its only true peritoneal covering. It also helps to form the rectovesical fossa. The blood vessels and nerves supplying the prostate, the cranial part of the pelvic urethra, and the bladder are covered dorsally by this layer of peritoneum. Only when they extend farther craniad than the neck of the bladder are they also covered ventrally by the ventral layer of the lateral umbilical ligament (fig. 2).

The main blood supply to the area, which can be readily distinguished by the surgeon at this time, comes from the umbilical and the urogenital arteries (fig. 3). On each side the umbilical artery, a branch of the internal iliac artery lies in the cra-

nial border of the lateral umbilical ligament. The umbilical artery reaches the bladder wall and continues over it as the cranial vesical artery. The urogenital artery leaves the visceral branch of the internal iliac artery at the level of the second or third sacral vertebra and invariably divides into 2 branches, 1 to the bladder and prostate gland (prostatica-vesical artery), and another to the prostate and urethra (prostatica-urethral artery). The prostatica-vesical artery passes to the bladder where it is continued as the caudal vesical artery. It ends by anastomosing with the cranial vesical artery and the caudal vesical artery of the opposite side. The prostatica-vesical artery gives branches to the prostate gland, the ductus deferens, ventral wall of the rectum, and the ureter. The prostatica-urethral artery passes caudomesiad to the lateral surface of the prostate gland, and then along this surface to the urethra where it is continued as the urethral artery, anastomosing with the urethral branches of the internal pudendal artery. The prostatica-urethral artery, gives off the majority of the prostatic branches, branches to the lateral wall of the rectum, and to the urethra along its length.

The nerve supply to this area, which is also visible at this stage, is clearly allied to the blood supply of the part (fig. 3). The hypogastric nerve, which carries the main sympathetic supply from the caudal mesenteric ganglion, can be seen in the lateral umbilical ligament accompanied always by a fine branch of the prostatica-vesical

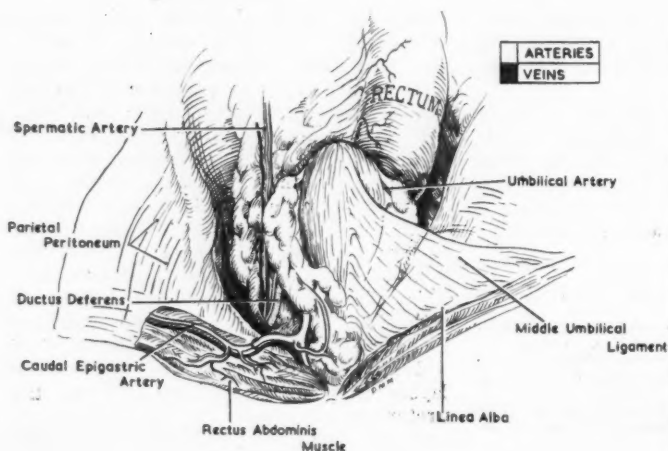


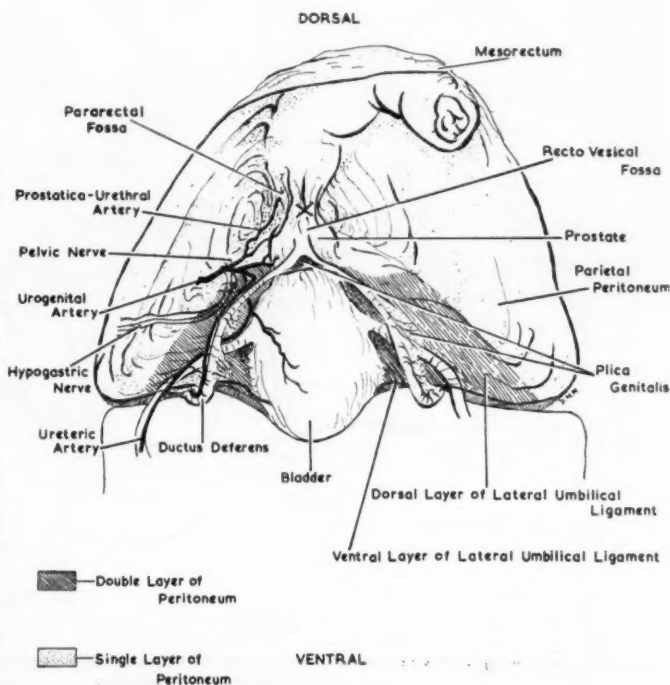
Fig. 1—Drawing of gross dissection of adult dog with the abdomen opened midventrally.

artery. The hypogastric nerve ends medial to the urogenital artery at the level of the prostate in a triangular thickening from which its branches arise. The pelvic nerve, which carries the main parasympathetic supply, may be either single (52% of the time) or double. It arises from the second sacral nerve and may also receive fibers from the first or third sacral nerve. The pelvic nerve lies either between the urogenital vein and the artery, or just caudal to the latter. It divides into a variable number of branches which form the pelvic plexus along with branches of the hypogastric nerve. The pelvic plexus can always be differentiated into three main parts—a cranial vesical plexus, a middle genital plexus, and a caudal hemorrhoidal plexus. The vesical plexus is formed by two main trunks, one from the hypogastric and the other from the pelvic nerve. These two nerves pass to the bladder and usually lie between the prostatica-vesical artery and the vein. The genital plexus lies in close proximity to the prostatic arteries. From it, nerve fibers pass to the prostate gland,

ductus deferens, and cranial part of the urethra. The hemorrhoidal plexus, which lies at the level of the caudal end of the prostate, gives off filaments to the rectum and to the pelvic urethra. The filaments to the urethra anastomose with the urethral branches of the pudendal nerves as they pass along the ventral surface of the urethra. These branches of the pudendal nerve carrying somatic and probably some autonomic fibers to the urethra and prostate can always be traced to the cranial third of the prostate or to the neck of the bladder.

The prostate gland is removed by dissecting it away from the neck of the bladder and the urethra (this entails the removal of the internal sphincter of the bladder), and by cutting a fascial band which is found in all adult dogs between the prostate and the rectum (fig. 4). The fascial band extending between the caudal third of the dorsal surface of the prostate and the ventral surface of the rectum carries blood vessels and nerves (fig. 2). In old dogs, it frequently contains smooth

Fig. 2—Drawing of a cross section through the lower abdomen of an adult dog (cranial view). This illustrates the arrangement and connections of the pelvic peritoneum with the lateral peritoneal folds (ligaments) of the bladder. Notice the attachment of the prostate to the rectum marked on the figure by an X.



muscle fibers. The blood vessels are usually branches of the prostatic arteries, and they anastomose with the arteries that supply the rectal wall. The nerves are derivatives of the hemorrhoidal plexus.

Discussion

The peritoneal and fibrous attachments of the prostate that must be severed to remove the gland have not been clearly described previously. The caudal third of the dorsal surface of the gland was always found attached to the rectum by a fibrous band. The published statement⁷ that the rectum and the prostate are completely independent was not confirmed for the adult dog. Authors hold conflicting opinions as to the relation of the prostate to the peritoneum. Two^{7,17} consider it to be intraperitoneal in position and suspended laterally by the lateral umbilical ligaments. Others^{4,16}

consider it to be retroperitoneal. The author is of the opinion that the prostate is suspended laterally by a single sheet of peritoneum which is a continuation of the dorsal layer of the lateral umbilical ligament, and that the blood vessels and nerves of the prostate lie ventral to this sheet as stated by one writer¹¹ and not between two layers of peritoneum as stated by others.² In the adult dog, the prostate is covered only on the cranial two thirds of its dorsal surface by peritoneum and is, therefore, retroperitoneal.

The author's description of the arterial supply resembles that of another,¹⁰ except in the branching of the urogenital artery. This was always found to divide into two branches which the author has named. The first (prostatica-vesical artery) branches to the bladder and prostate; the second (prostatica-urethral artery) branches to the prostate and urethra and ends by

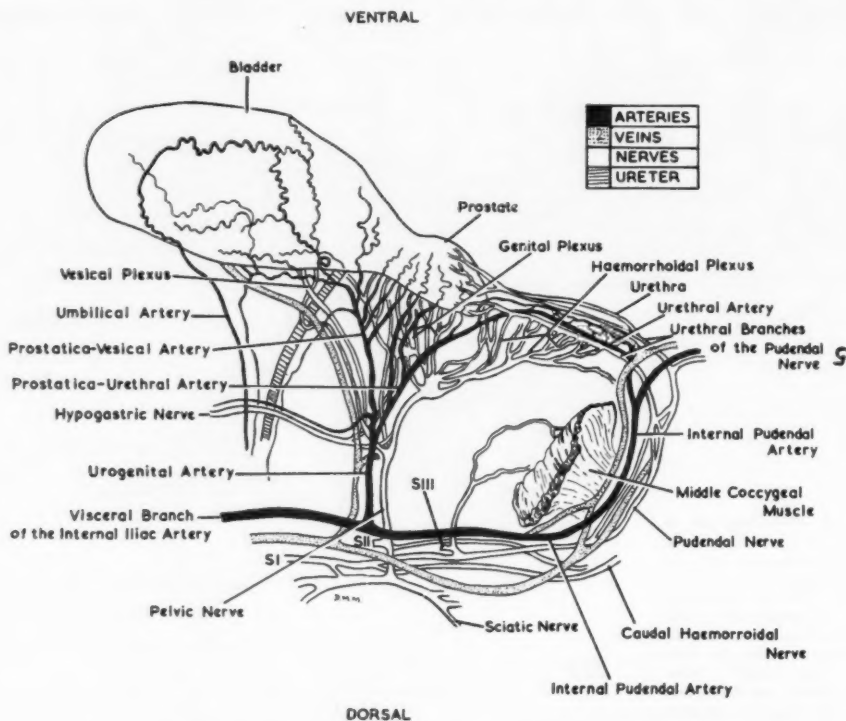


Fig. 3—Drawing of the relationship of the nerves and arteries supplying the bladder, prostate, and urethra of an adult dog.

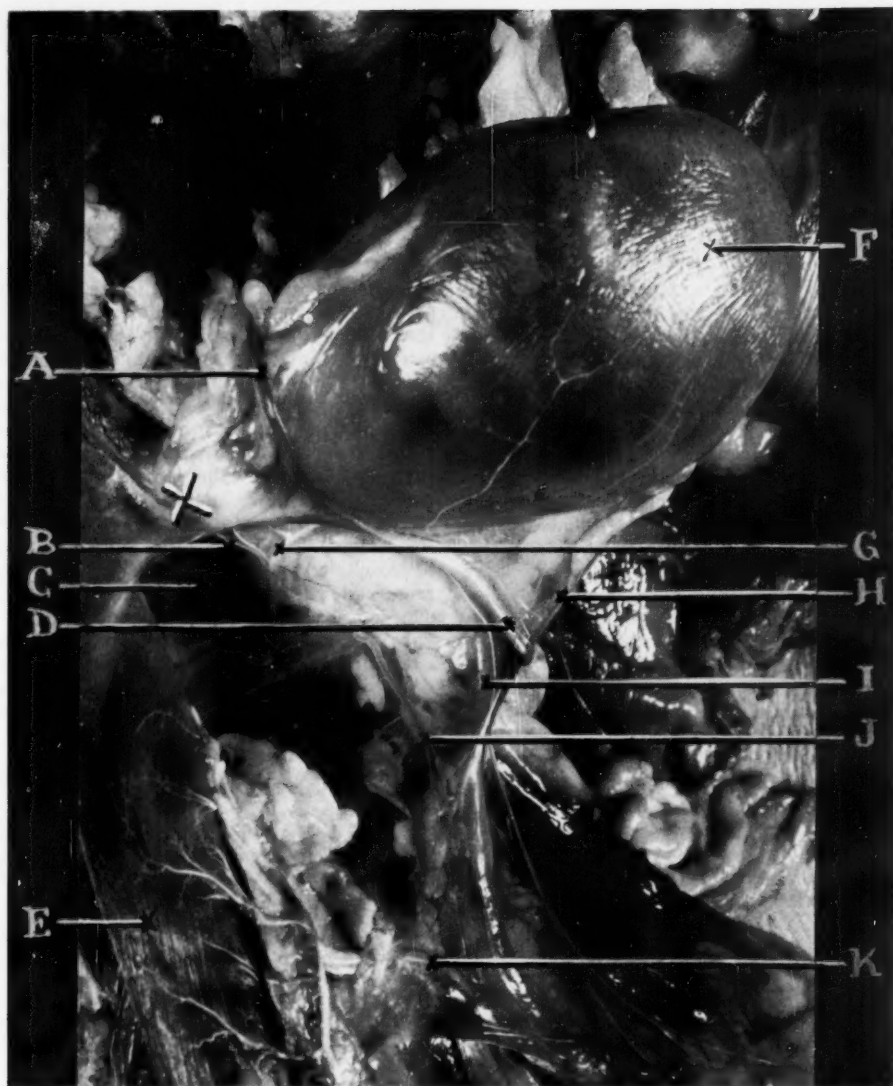


Fig. 4 — Photograph of a gross dissection of an adult dog with the bladder pulled aside to show the pararectal fossa.

A-ductus deferens; B-prostatica-urethral artery; C-pararectal fossa; D-deferential artery; E-rectum; F-bladder; G-prostatica-vesical artery; H-umbilical artery; I-ureter and the ureteric artery; J-hypogastric nerve and its artery; K-caudal mesenteric artery; X-attachment of the rectum to the prostate gland.

anastomosing with the urethral branches of the internal pudendal artery.

The important surgical features that have not been mentioned in the literature are the anastomosis between the prostatica-urethral and the internal pudendal arteries, and the anastomosis between the prostatic arteries and the hemorrhoidal supply of

the rectum. Both or either of these have been shown to be capable of maintaining the blood supply if all the other vessels are severed.⁶ The branch from the caudal epigastric artery or pudendo-epigastric trunk which is frequently mistaken for the urogenital artery has not been previously described.

The most serious mishap after prostatectomy in both man and dogs is urinary incontinence or bladder injury or both. In man, for urinary incontinence to occur, both the internal and external sphincter muscles of the bladder must be destroyed or both the pelvic nerves damaged.^{1,12} Since the nerves are naturally protected in the usual surgical approaches, this latter occurrence is extremely rare.³ In the operation most favored for prostatectomy in the dog, the internal sphincter is destroyed but the external sphincter, which according to one writer⁵ is the urethral muscle, should be intact and capable of maintaining urinary continence. However, the nerves are vulnerable because of their position. In the author's opinion, the most probable cause for urinary incontinence in the dog after prostatectomy is injury to the pelvic nerve on both sides, thus destroying the reflex arc concerned in micturition.

If, during removal of the prostate gland, hemorrhage is controlled by ligating the urogenital artery, care must be taken to avoid damage to the pelvic nerve which lies either between the artery and the vein or just caudal to the artery. Alternatively, if the hemorrhage is controlled by ligating the prostatic arteries, care must be taken to avoid damage to the branches to the bladder of the hypogastric and pelvic nerves which always lie between the prostatico-vesical artery and vein. The nerve fibers to the rectum from the hemorrhoidal plexus may also be injured when the fascia connecting the prostate and rectum is cut. However, this is unlikely to be of major importance since there are quite a large number of branches and it is doubtful that all of these would be damaged. The same holds true for the branches to the urethra. Even though the cranial branches from the genital plexus were destroyed, those from the hemorrhoidal plexus would be left intact.

Summary

The anatomy of the bladder, prostate, and urethra was studied in 119 male dogs by gross dissection, use of vascular injections, nerve staining, and roentgenography.

Of the three peritoneal ligaments of the bladder, only the dorsal layer of the lateral umbilical ligament extends caudad beyond the neck of the bladder and covers the cra-

nial two thirds of the dorsal surface of the prostate. The caudal third of the dorsal surface is connected to the ventral face of the rectum by a fascial band. The umbilical artery supplies the cranial part of the bladder.

The urogenital artery divides into two branches of which one supplies the cranial part of the prostate and the caudal part of the bladder and the other supplies the caudal part of the prostate and the pelvic urethra. The latter branch ends by anastomosing with the urethral branches of the internal pudendal artery. Anastomoses between the prostatic arteries and the hemorrhoidal supply of the rectum are always present. The pelvic nerve lies either between the urogenital vein and artery or just caudal to the artery. It joins with the hypogastric nerve to form the pelvic plexus from which filaments follow the arteries to supply the bladder, prostate, and urethra.

Injury to the pelvic nerves is the main surgical hazard in pelvic surgery in the dog, whereas interruption to the blood vessels is of secondary importance because of the many anastomoses.

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Management of Prostatism

The simple discovery of an enlarged prostate in a patient relatively asymptomatic is not an indication for operation. Some patients with mild frequency and some difficulty in voiding, but without residual urine, may continue to have the same disorders after an operation. Since the end results of prostatic surgery are not uniformly excellent, such cases should have the benefit of an adequate period of conservative treatment. In patients with an associated infection of the bladder or pros-

tate, operation should be delayed until infection is controlled.

Often such management reduces the symptoms to such an extent that the patient is content for months or years. Surgery is advised as the initial treatment when the urogram shows definite obstructive changes in the urinary tract, evidenced by trabeculations, sacculations, diverticula, dilatation of the upper urinary tract, or residual urine.—*Pennsylvania Med. J.*, 62, (June, 1959): 825.

Griseofulvin for Persistent Fungal Infections

Thirty-four patients with fungal infections of the skin were treated in England with oral griseofulvin in a dosage of 1 to 2 Gm. daily.

Two children with candidiasis and 1 man with tinea versicolor showed no improvement.

Two patients infected with *Trichophyton verrucosum* derived no significant benefit.

Infection by *Trichophyton mentagrophytes* in 1 patient cleared after 4 weeks' treatment.

Two persons with *Trichophyton rubrum* infection of the smooth skin were treated for 3 weeks; 1 recovered completely and the other improved.

Twenty-six patients with long-standing *T. rubrum* infection with nail involvement were treated for periods of 3 to 20 weeks. The majority improved, but in only 1 instance was the infection eradicated.

Among the signs of toxicosis appearing in a few patients were headaches, malaise, erythematous rash, and fever.—A. J. Barlow et al, in *Brit. Med. J.* (Nov. 28, 1959): 1141-1143.

Restraint of Chimpanzees

with Perphenazine

Gordon D. WALLACE, D.V.M.
Andrew R. FODOR, Ph.D.
Leland H. BARTON, M.S.

EXPERIMENTAL STUDIES in our laboratory required the use of 10 chimpanzees. They ranged from 5 to 7 years of age and 17 to 28 kg. in weight. Anticipated manipulations involved performing periodic venipunctures, swabbing the nasopharyngeal area, and inserting rectal thermometers. For the contemplated studies, the chimpanzees were transferred from larger accommodations, which had permitted relatively greater freedom of movement, to smaller individual cages constructed of 12-gauge expanded steel mesh. The size of these cages facilitated capture when necessary but limited the normal amount of physical activity which the animals required. Because of minimum handling for 2 years and the animals' agility and strength, manual restraint during the required manipulations was considered impractical.

It appeared that use of tranquilizing drugs might prevent the trauma which physical restraint could produce. Reports on use of phenothiazine derivatives for restraint of domestic animals are well documented.^{5,7,8} Some data are also available on the effect of these drugs in monkeys.^{3,4} However, information concerning their use in anthropoids appears to be lacking.

After investigating employment of tranquilizers in general veterinary practice and reviewing current literature, perphenazine* was selected, and results of experiences with it are described here. Since anthropoids are utilized currently in a wide variety of experimental activities, particularly in the field of space medicine,

it is believed that observations with this type of drug will provide useful information.

Material and Methods

Selection of the phenothiazine derivative, perphenazine, was based on reports indicating as much as 5 to 20 times greater potency than that of some other phenothiazine derivatives.^{1,3} Thus, it was hoped that use of smaller effective doses would provide a wider margin of safety before toxic levels were reached.

The nature of the experiment and monetary value of the chimpanzees required careful adjustment of dosage schedules. Three separate trials with gradual increase of the individual drug intake were required before adequate dosage was achieved. Orally administered drug was varied through a range from 1.25 mg./kg. to 4.4 mg./kg. of body weight. Each dose was prepared by triturating the required number of 4-mg. or 8-mg. tablets and suspending the powder in approximately 8 oz. of canned pineapple juice. This medium was generally preferred to vegetables or bananas homogenized in a Waring blender. The one exception was a particularly intractable female which consistently refused the oral preparation. In this case, a manually operated squeeze platform was installed in the cage to hold the chimpanzee firmly to the wall while the tranquilizer was administered intramuscularly. Four milligrams (0.2 mg./kg. of body wt.) provided an adequate tranquilizing dose.

Three other chimpanzees refused at least part of the preparation toward the end of the experiment. However, these animals had become accustomed to the required

From the Virus and Rickettsia Section, Laboratory Branch, Communicable Disease Center, Montgomery, Ala.

*Trilafon—1-(2-hydroxyethyl)-4-[3-(2-chloro-10-phenothiazinyl)-propyl]-piperazine. Schering Corp., Bloomfield, N.J.

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service.

TABLE 1—Quantity and Frequency of Perphenazine Administration to Tranquelize 10 Chimpanzees

Chimp. (No.)	Body wt. (kg.)	Daily perphenazine administered orally (mg.)														Total perphen. administered (Gm.)			
		2/10	2/18	5/7	5/8	5/12	5/13	5/16	5/21	5/26	6/2	6/10	6/17	6/24	7/1		7/15	7/29	8/28
1	25	40*	64	64*	80	84	88	88	64	64	64	64	64	64	64	64	64	64	1.168
2	18	30*	50*	54*	34*	25*	76	76	4**	4**	4**	4**	4**	4**	4**	4**	4**	4**	0.309
3	23	40	64	64	64†	52	56†	56†	64	25*	72	18*	72	48	56	56	56	56	0.619
4	21	40*	56	56*	68	68	72	72	96	80	80	80	80	64	64	64	64	64	0.86
5	18	40*	48*	64*	72	68	72	96	96	80	80	80	80	64	64	64	64	64	1.14
6	28	...	...	64	72*	92	96	96	80	80	80	80	80	64	64	64	64	64	1.06
7	21	...	...	56*	64*	76*	84*	88	88	88	88	88	88	25*	72	72	72	72	1.015
8	20	...	...	48*	72*	84*	88	88	88	88	88	88	88	44	60	88	44	88	1.084
9	17	...	...	48*	72*	76*	88	88	64	64	64	64	64	56	56	...	...	...	0.644
10	20	...	...	48*	72*	76	80	80	64	64	64	64	64	56	56	...	...	...	0.644

Manipulations performed under tranquilization were 2/10 and 2/18—venipuncture and temperature per rectum; 5/7 to 6/10—venipuncture, throat swabbing, and temperature per rectum; and 6/17 to 8/28—venipuncture.

*Restraining effect was inadequate with indicated quantity. **Drug was administered intramuscularly. †Parkinsonian type of reaction.

There was no residual effect from the perphenazine in any of the animals.

manipulations, and venipunctures could be performed without restraint.

Results

Oral administration of perphenazine as a suspension in fruit juice produced optimal tranquilization of chimpanzees in approximately 3 hours and persisted noticeably for 6 to 7 hours. The quantities and frequency of drug administration throughout the experiment were tabulated (table 1).

The most traumatic experience for these experimental chimpanzees, as well as the handlers, was their being tied to a restraining table to obtain throat swabs and rectal temperatures. This required maximum restraint with drug doses varying between 2.4 mg. and 4.4 mg./kg. of body weight. Dosage could be reduced considerably when the procedure was limited to collection of blood samples by radial venipuncture.

Individual response to perphenazine varied significantly and was generally related to the disposition of each chimpanzee; the more apprehensive and intractable individuals required larger doses. What appeared to be a toxic reaction was observed in 1 chimpanzee which developed a type of Parkinsonian syndrome when more than 55 mg. of drug was administered. Similar reactions induced by phenothiazine derivatives have been adequately discussed elsewhere.³ Severity of this reaction, which was observed several times in the same animal, was reduced when the dosage was lowered to a 2.3 mg./kg. level. Treatment was discontinued shortly thereafter because the animal became comparatively easy to handle.

At the peak of therapy, minor degrees of motor restlessness, slight tremors, and muscle weakness were occasionally observed in the other chimpanzees. Drowsiness was the most constant reaction.

Liver damage and disturbance of hematopoiesis have been reported following administration of toxic doses of phenothiazine derivative tranquilizers to various animals.³ Blood samples drawn for immunologic studies were also examined for hematologic changes and evidence of liver damage. Peripheral blood studies showed no evidence of adverse effects of the drug as administered. Except for slightly ele-

vated leukocyte counts observed in 2 chimpanzees, hematologic values remained normal during treatment. Serum transaminase levels⁶ as well as serum protein content remained within normal limits. Paper chromatographic analysis of serum samples, collected during and after completion of the experimental studies, showed a normal pattern and concentration of protein components.²

Conclusions

Manual restraint of adolescent and adult chimpanzees poses a formidable problem when individual handling is required. In our experience, 4 or 5 animal handlers and an adventurous laboratory technician were required for periods of 4 to 6 hours each day to enable collection of blood specimens, throat swabs, and rectal temperatures, and to permit physical examination of 10 chimpanzees. With effective dosage schedules, routine use of perphenazine shortened handling time to approximately 1 hour and lowered required personnel to 3 or fewer.

With one exception, only minor untoward reactions to perphenazine were observed with complete recovery in every case. There was no clinical or laboratory evidence of damage in spite of rather large

doses of perphenazine frequently administered for more than 8 months. It is the opinion of the authors that judicious use of perphenazine is a safe and effective method to facilitate handling and restraint of chimpanzees.

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Ear Cropping Legalized in Pennsylvania

A change in the Pennsylvania laws so as to legally permit the operation of ear cropping by veterinarians was realized Aug. 14, 1959. Prior to that time, Pennsylvania dog owners who wished to have their dogs' ears cropped had to take the dogs outside their home state.

Credit for the legislation was attributed to each veterinarian who wrote to his senator, to the Pennsylvania State Veterinary Medical Association Legislative Committee, and to the senators and representatives who voted for passage.—*Pa. Vet.*, 1, (Dec., 1959): 28-29.

Editorial

Antibiotics in Milk — Where Do We Stand?

The contamination of market milk with antibiotics is a problem that began in the 1940's. It was given considerable impetus by drug company promotion of antibiotics directly to the milk producers and was sharply emphasized by recent reports in the literature that human beings have developed signs of penicillin sensitivity after drinking market milk.

The Many Groups Concerned

The dairy industry, although benefiting greatly from the antibiotic treatment of mastitis, was perhaps the first to feel the adverse effects. Coincidental with the first use of penicillin to treat mastitis, the manufacturers of cheese and other dairy products dependent upon bacterial action began to experience difficulties because of antibiotic contamination of raw milk.

Interest of the Food and Drug Administration is clearly evidenced by four nation-wide surveys in which penicillin was detected in 3.2 per cent, 11.6 per cent, 5.9 per cent, and 3.7 per cent of the samples tested in 1954, 1955, 1956, and 1959, respectively. There is little doubt that this agency will, in the near future, enforce zero tolerance levels for antibiotic and pesticide residues in milk.

The American Medical Association has more than a casual interest in this public health problem and, through its Council on Drugs, is reported to have recommended that FDA take the necessary steps to eliminate antibiotics from market milk.

The manufacturers and distributors of antibiotics have much at stake because any

restriction of the use of antibiotics for animals would affect sales volume and change the sales-distribution pattern of certain preparations. Far-sighted manufacturers should now be anticipating the coming need for more explicit information regarding the time required for their particular antibiotic products to be eliminated from the udder. Obviously, the withholding of milk from antibiotic-treated cows for a standard 72 hours will not be satisfactory under a zero-tolerance program designed to keep antibiotics out of market milk.

The farmer's position is clear enough for those who are producing milk under a properly supervised mastitis control program. Under such a program, infected quarters are detected promptly, the causative organism is identified, the preferred antibiotic is selected on a scientific basis, and the veterinarian advises the farmer to withhold milk from the treated udder for a specified length of time, depending upon the preparation used.

In the case of the "do-it-yourself" producer, the position is untenable. He infuses antibiotics into udders indiscriminately, often when infectious agents are not even involved, and his selection of antibiotics is not based on identification of the organism or its sensitivity to the antibiotic. Whether he withholds milk from his shipments for a sufficient number of days depends pretty much upon how well he reads product labels and upon his unselfish and enlightened interest in the public welfare.

What Has Been Done?

The AVMA is already on record (*see* editorial, July 1, 1959, JOURNAL) as favoring restriction to "prescription only" of antibiotic preparations intended for mastitis treatment. Although it would be naive to assert that this restriction alone would prevent the contamination of market milk, it would greatly curtail the widespread indiscriminate use of such products.

We have also said that drugs like penicillin are indispensable to modern veterinary practice and that any attempt to completely remove them from veterinary use would constitute unwarranted interference with veterinary practice. Further, we have indicated that the development of a practicable test procedure for revealing the

presence of penicillin in market milk would be desirable. Since then, descriptions of at least two "rapid" tests have been published.

Officials in at least eight states have warned veterinarians to advise clients about the danger of permitting milk from treated cattle to get into market channels. As recently as January 5, the AVMA suggested to all constituent association secretaries that similar action would be appropriate in all states.

In early recognition of this problem, England has already restricted antibiotics to prescription only. In Sweden, antibiotics are not only restricted to prescription, but both the veterinarian and the producer are required to report to the dairy such treatment of dairy cattle (*see* 2 items, pp. 198, 209, this JOURNAL).

Needed Now

Milk processors should now be supporting a vigorous research program designed to develop and evaluate, as quickly as possible, a rapid test for the detection of penicillin in milk, for we believe that only by

the application of such tests at the receiving platform will absolute control be achieved. With such testing, the use of antibiotics without professional supervision will be discouraged; some producers will quickly learn that they can no longer add penicillin to bulk raw milk in order to control the bacterial count; others will find it inadvisable to disregard the veterinarian's advice to withhold, from the market, milk from treated cows. Few will intentionally risk having an entire shipment returned unpaid for.

Veterinarians as individuals should be watching closely all of the developments concerning antibiotic residues in foods. Whenever we treat food-producing livestock with antibiotics, we should make certain that the owner is properly cautioned with respect to withholding animals or food products from the market. In our daily contacts, not only with farmers but also with other professional people and with the general public, we should reflect the attitude of our Association toward this problem, and we should influence our listeners in the direction we know to be for the public good.

Comparison of CMT and Whiteside Tests

A study was made to determine the incidence of mastitis in 28 herds comprised of 533 cows at the Ontario Veterinary College. The CMT (California mastitis test) and modified Whiteside test were applied to bulk tank, weigh-tank, and quarter samples and the results compared.

For quarter samples, the CMT and Whiteside tests closely reflected the leukocyte count. A trace CMT reaction appeared for more samples containing less than 500,000 cells per milliliter than with the Whiteside test.

For herd milk, the CMT appeared more sensitive on bulk milk samples than the Whiteside test. On 28 herd samples, 2 were negative to CMT while 12 were negative to the Whiteside test. On weigh-tank samples, both tests appeared to be the same.

A 1+ reaction in bulk tank milk on

either CMT or Whiteside indicates that over 30 per cent of the quarters are infected. A trace CMT reaction may indicate less than 10 to more than 50 per cent of the quarters infected. There is good agreement between CMT and Whiteside test on herd milk of can shippers relative to the percentage of infected quarters. A trace reaction with either test probably indicates a fair degree of infection. Of the herd samples from bulk tank shippers, 37.0 per cent gave a trace CMT and negative Whiteside reaction, while only 3.5 per cent gave this reaction in samples from can shippers.

There was complete agreement between the 2 tests in 48.2 per cent of bulk tank samples, as compared with 71.9 per cent of the can shippers' weigh-tank samples.—*Vet. News*, 23, (1959): 26.

from the *Research Journal*

Absorption of Red Blood Cells

Canine red blood cells tagged with sodium radiochromate were transfused by various methods into dogs. An average of 81.7 per cent of the red blood cells given intraperitoneally were absorbed intact into circulation of 41 dogs. An average of 3.0 per cent of the cells injected subcutaneously and intramuscularly were absorbed intact. Red blood cells transfused via the medullary cavity of the femur passed very rapidly into

circulation, 95.3 per cent of which were absorbed intact.

The average rate of peritoneal absorption of red blood cells was 48.0 per cent in 24 hours, 65.0 per cent by 48 hours, and up to an average of 81.7 per cent in two weeks.—[Carl H. Clark and C. H. Woodley: *The Absorption of Red Blood Cells After Parenteral Injection at Various Sites*. *Am. J. Vet. Res.*, 20, (Nov., 1959): 1062-1066].

Sperm Capacitation Factor in the Genital Tract of the Female Rabbit

The influence of washing, and the time spent in the female genital tract, on the fertilizing ability of the sperm was investigated. In five experiments, fertilization was attempted by deposition of semen or washed sperm into the higher reaches (oviduct, uterus) of the female genital tract.

The outcome of the experiment was decided by the presence of living blastocysts. By that standard, successful fertilization was achieved by twice-washed sperm, ab-

normal development by once-washed sperm, and apparently no fertilization when whole semen was used.

Considering the influence of time, successful fertilization took place after four to six hours of "capacitation" of sperm.—[R. Hadek: *Study of the Sperm Capacitation Factor in the Genital Tract of the Female Rabbit*. *Am. J. Vet. Res.*, 20, (July, 1959): 753-755.]

Inactivation of Foot-and-Mouth Disease Virus

Virus in the supernatant fluid of a centrifuged 10 per cent suspension of infected bovine tongue epithelium was used. The pH of the supernatant fluid of the virus suspension was adjusted to a pH of 8 with M disodium acid phosphate. The inactivation of virus with beta-propiolactone took place in vials equipped with a thermometer and a bar magnet. The vial and its contents were submerged in a precision water bath at 37 C. over a magnetic stirrer. Concentrations of 0.5, 0.4, 0.3, 0.2, 0.1, and 0.05 per cent of the chemical were tested in 20-ml. volumes of the virus suspension with a 15-minute exposure to the temperature maintained in the water bath. After heating, the pH of the mixtures was adjusted to 7.2 by the addition of 0.05 N HCl. The infectivity of original as

well as treated virus was tested in steers by the inoculation of dilutions of the viral preparations into the dermis of the tongue. In addition, 5 ml. amounts of the 10^{-1} dilution were inoculated into the dermis of the tongues of additional cattle. Unweaned mice and culutres of growing bovine kidney cells were inoculated with the untreated and treated viral preparations. The original and treated viral preparations were tested as antigens in a Traub-Mohlmann complement-fixation test. The serums of cattle surviving the inoculations of treated viral preparations and showing no signs were tested for the presence of virus-neutralizing and complement-fixing antibody. Beta-propiolactone in a concentration of 0.3 per cent inactivated the virus of foot-and-mouth disease, Type

A-119, in bovine tongue epithelium suspension in 15 minutes at 37 C. This chemically treated antigen, in amounts of either 1 or 5 ml., did not induce complement-fixing or virus-neutralizing antibody in steers. An inactivated antigen which may be used in the

complement-fixation test described was produced.—[O. N. Fellowes, A. G. Edward, J. Tessler, G. C. Poppensiek, and J. B. Sharp: *The Inactivation of Foot-and-Mouth Disease Virus, Type A-119, with Beta-Propiolactone*. *Am. J. Vet. Res.*, 20, (Nov., 1959): 992-995.]

Evaluation of Complement-Fixation Test in Foot-and-Mouth Disease

A study and comparison of some of the complement-fixation techniques employed in foot-and-mouth disease (FMD) with bovine and guinea pig serums is described. An eight- to tenfold increase in demonstrable antibody titer, without any apparent loss in specificity, was evidenced in both guinea pig and bovine serums when the fixation period of 18 hours at 4 to 8 C. was used rather than 30 minutes at 37 C. It was shown that a complement-fixation test based upon a direct visual 100 per cent end point method was sensitive enough to demonstrate FMD virus antibodies in guinea pig and bovine serums.

There was no apparent difference in test results when antigens were heated at 56 C. for 30 minutes, although there was an indication that infective vesicular fluid may be a better antigen than infective tongue epithelium. Preliminary data indicated little or no advantage in the use of hemolysin prepared against boiled sheep erythrocyte stroma in this direct 100 per cent end point method.—[M. Savan: *An Evaluation of the Complement-Fixation Test in the Study of Foot-and-Mouth Disease*. *Am. J. Vet. Res.*, 20, (Nov., 1959): 996-1001.]

Hematological Effects of Blood Loss in Monkeys

Thirty normal male *Macaca mulatta* monkeys, weighing 1.8 to 3.6 kg., were divided into 6 groups of 5 animals each and subjected to acute blood loss of 60 ml. (37% of blood volume); to chronic blood loss of 4 ml. (2.5%), 10 ml. (6%), 20 ml. (12%), or 30 ml. (18%); or 40 ml. (24%) weekly for a period of 8 weeks. The animals which underwent severe acute blood loss demonstrated a significant return of the erythroid elements, whereas 20-, 30-, and 40-ml. losses

could not be compensated for during the experimental period of 8 weeks. The results and implications of the acute and chronic blood loss experiments are compared with those obtained in other species, including man.—[G. M. Krise and N. Wald: *Hematological Effects of Acute and Chronic Experimental Blood Loss in the Macaca mulatta Monkey*. *Am. J. Vet. Res.*, 20, (Nov., 1959): 1801-1085.]

—New Books—

Synopsis of Anesthesia

This book summarizes current teaching and practice in the field of human anesthesiology. It has a convenient size and is printed on good quality paper. The illustrations are clear and concern, for the most part, anesthetic equipment. The bibliography is ade-

quate and selected for additional reading. For the veterinarian, the book has the usual disadvantages of a text about man and, since it is British, much of the equipment discussed is of British manufacture.

This edition differs from previous ones by

the addition of new figures and by the addition of two new chapters concerning the phenothiazine-derivative tranquilizers and induced hypothermia. There is also a new section on fluothane. Despite its disadvantages, the book has a wealth of good, readily accessible information, especially for those interested in inhalation anesthesia. It includes not only the theory of various techniques but also a description of them. The discussion of intravenous anesthesia is largely confined to the use of thiopental sodium. Other intravenous anesthetics are discussed briefly in comparison with thiopental. The new chapter concerning the phenothiazine-derivative tranquilizers is disappointing. It is confined largely to chlorpromazine. The

only other tranquilizer of veterinary interest mentioned is promethazine hydrochloride.

The chapters discussing regional and local anesthesia contain little of veterinary interest with the exception of basic information concerning spinal anesthesia. The chapter concerning shock and salt and water balance is especially useful, but information on resuscitation, especially automatic respiration, is minimal.

Despite its shortcomings, the book contains much useful information and should serve as a good reference for the veterinarian wishing to improve his anesthetic technique.—[*A Synopsis of Anesthesia*. By J. Alfred Lee. 4th ed. 660 pages. 72 illustrations. Williams & Wilkins Co., Baltimore 2, Md. 1959. Price \$6.50.]—E. WYNN JONES.

British Veterinary Codex Supplement 1959

This publication contains numerous monographs on drugs, chemicals, antisera, vaccines, and related products for use in the practice of veterinary medicine. It has been revised to make it current as of 1959. There are 47 new monographs on drugs, chemicals, and related substances. Other monographs have been added on canine distemper, hepatitis antiserum, John's disease vaccine (living), myxomatosis vaccine (living), ovine enzootic abortion vaccine, and swine erysipelas vaccine, attenuated (living); also a new general monograph on mixed bacterial vaccines. Thirty-five new monographs, mainly on preparations of new drugs

and chemicals, are included in the Formulary Section. This section also includes monographs on antibiotics as dietary supplements.

The Codex was compiled with the advice and assistance of the Royal College of Veterinary Surgeons, the British Veterinary Association, and various governmental agencies and pharmaceutical firms.—[*British Veterinary Codex Supplement 1959*. Published by direction of the Council of the Pharmaceutical Society of Great Britain. 134 pages. Illustrated. Pharmaceutical Press, 17 Bloomsbury Square, W.C.1, London. 1959. Price about \$5.00.]

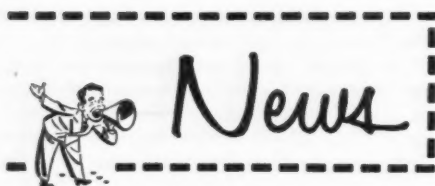
Veterinary Drug Encyclopedia Changes Owners

Purchase of six publications from Drug Publications, Incorporated, was announced by the Rueben H. Donnelly Corporation of Chicago, Ill. The publications include the "Veterinary Drug Encyclopedia."

Other publications sold were the *American Journal of Medicine*, *American Journal of Surgery*, *American Journal of Clinical Nutrition*, *American Journal of Cardiology*,

and "Modern Drug Encyclopedia and Therapeutic Guide."

The Donnelly Corporation also is engaged in telephone directory publishing and direct mail advertising and merchandising, operating in over 80 locations nationally and employing over 8,000 people.—*News release*, Donnelly Corp., Nov. 18, 1959.



Veterinary Contributions to Space Flight

A group of 18 veterinarians in the Air Research and Development Command (ARDC) working with other scientists in solving problems in biomedical areas incident to man's conquest of the vertical frontier, have been credited with many important contributions to aero- and space medicine.

These include rocket-track experiments in windblast and deceleration tests of human beings and animals; high-altitude balloon flights with human beings and animals; sub-gravity and zero-gravity studies; isolation and environmental tests for future space flight; escape physiology and tests of ejection seats and capsules; care, training, and conditioning of animals for biomedical research tasks; and, of much more value, protecting and sustaining our airmen in flight.

Although this feature is confined largely to the ARDC, there are other Air Force veterinarians in the School of Aviation Medicine and in the Arctic Aeromedical Laboratory who also perform research. In addition, a number of Air Force veterinarians work in research and development projects in joint service institutions such as the Naval Radiological Laboratory, the Armed Forces Institute of Pathology, the Quartermaster Food and Container Institute for the Armed Forces, the National Aeronautics and Space Administration, the Oak Ridge Institute of Nuclear Studies and at several Atomic Energy Commission installations. Of the 300 veterinary officers in the U.S. Air Force, approximately 40 actively support biomedical research and development.

A Veterinarian Heads Biomedical Division

A veterinarian, Dr. (Lt. Col.) Albert A. Taylor (WSU '37) is chief of the Biomedical Division of ARDC. In this capacity, he manages and guides the research and develop-

ment efforts of 700 scientists and engineers in solving the future problems of man involved in space exploration. He also provides special guidance to veterinarians throughout his command.

Colonel Taylor has a M.P.H. degree from Harvard University (1953). He is a fellow of the American Public Health Association, a member of the AVMA, the Association of Military Surgeons, the Aero-Space Medical Association, the Institute of Food Technologists, and the Conference of Public Health Veterinarians.

On the succeeding pages, some of the veterinarians who participate in the Air Force biomedical research program are shown in their daily routines. These pictures were collected from the Wright Air Development Center (WADC) in Ohio, and the Air Force Missile Development Center (AFMDC) in New Mexico.

In conjunction with this pictorial digest, is a synopsis of a paper which Colonel Taylor presented at the District of Columbia's annual meeting, on Oct. 13, 1959.



Lt. Colonel Albert A. Taylor

Animals Precede Men into Space

Veterinarians Assist in Research

I—Because animals precede men into space exploration, the veterinarian is needed to assist in biomedical research projects that require animals. He then becomes a member of a team that uses an interdisciplinary approach to the solution of these problems. Other team members may be physiologists, anthropologists, physicians, food technologists, statisticians, mathematicians, chemists, engineers, or members of other disciplines.

This type of veterinary assistance in research which requires animals falls into several categories:

- 1) The veterinarian participates in planning and in the selection of research programs which utilize animals. He plans the experimental procedures to be used and he makes the selection of appropriate species. Animals differ in the degree to which they resemble human beings with respect to various functions and, because equal weight allotments will not always be available, the utilization of animals of different species provides the maximum of useful information to benefit mankind. The quality of re-

search results is directly related to the quality of the animals used in research procedures. The laboratory animal should be considered in the same light as any other tool or reagent used in research.

- 2) The veterinarian establishes requirements and health standards for inclusion in purchase agreements. Immediate physical examinations on arrival are most important in detecting diseased or otherwise unsuitable animals.

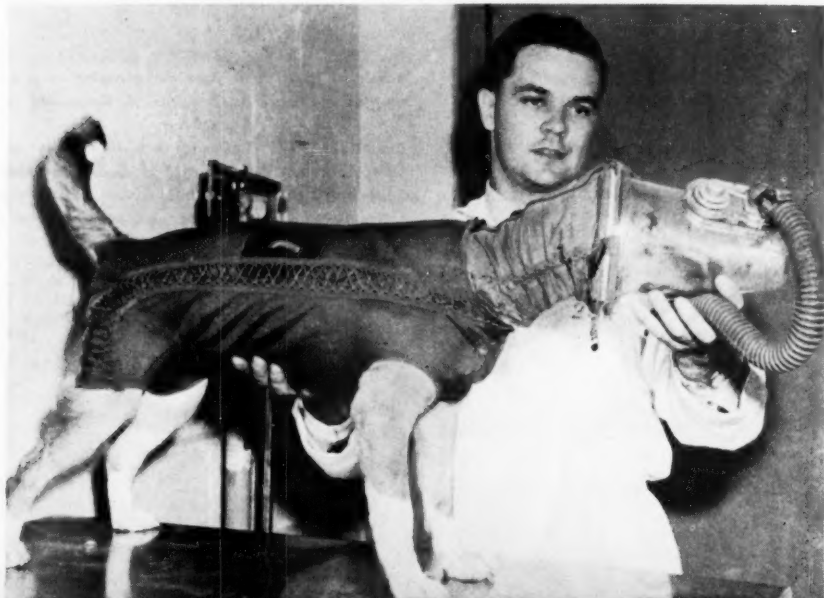
- 3) The veterinarian can test and formulate foodstuffs for experimental animals and he is adept at advising as to the types of cages, equipment, and supplies needed for animal colonies.

- 4) The veterinarian prepares the animals for study. This includes administration of anesthesia and the application of special surgical techniques. Catheters may be placed in blood vessels to measure aortic pressure; electrodes may be installed in specific areas of the brain to determine oxygen potentials; and sensing devices may also be implanted in organs. In addition, these latter animals need postsurgical care during long term experiments.

Canine Pressure Suit and Oxygen Helmet

Pressure suits must be worn by animals, including man, for protection at altitudes above 40,000 feet. This dog (below) has been outfitted with a pressure suit and oxygen helmet to withstand an explosive decompression which simulates the conditions which occur when the canopy of a pressurized aircraft blows off at high altitudes. Results of this work already have contributed to the saving of lives of air crews.

Dr. (Capt.) Keith Kraner (OSU '56) is shown holding the dog.—WADC, Ohio.





Dr. (Capt.) Franklin Kriewaldt (MIN '57) of Aerospace Medical Laboratory central animal facility is shown making a daily examination of cranial electrode leads on an opossum (the animal is literally wired for sound).

Maintenance of experimental animals with surgically implanted instrumentation requires daily examination and medication.—WADC, Ohio.



Dr. (Capt.) James E. Cook (OKL '51), chief of the veterinary services branch at the Aeromedical Field Laboratory, uses an otoscope in examining a young chimpanzee at the laboratory's vivarium. The animal is being held by a medical technician. Dr. Cook is responsible for the training and conditioning of various animals used in isolation and environmental tests connected with biomedical research in space travel.—AFMDC, New Mexico.



Dr. (Capt.) LaVern H. Doerr (ISU '56) is shown administering a physical examination to a Cynomolgus monkey. Dr. Franklin H. Kriewaldt is assisting.

Drs. Doerr and Kriewaldt are in charge of the central animal facility of the Aerospace Medical Laboratory at Dayton. Their duties include preparation of all animals for experiments.—WADC, Ohio.

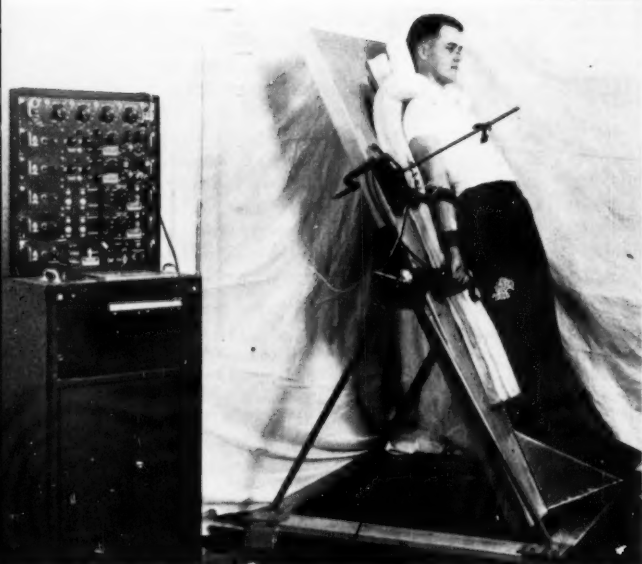
Dr. (Major) John D. Mosely (AU '48), chief of the bioastronautics branch, Aeromedical Field Laboratory, comes to an abrupt stop in the "bopper" sled or crash restraint demonstrator. A 20-foot sled-and-track unit, it is used for human endurance tests of abrupt deceleration.

The shock-cord-impelled acceleration of the sled builds up multi-G forces in deceleration which constitutes one of the many biomedical problems involved in space medical research.—AFMDC, New Mexico.



Dr. (Capt.) Neville Clarke (TEX '54), chief of the acceleration section of the Aerospace Medical Laboratory, undergoes a study of venous movement on the tilt table.—WADC, Ohio.

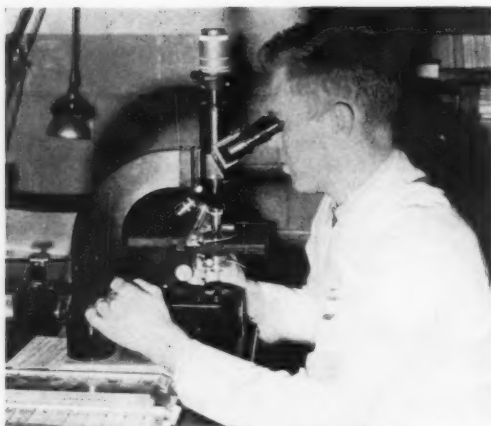
(Technically, this study is termed the measurement of pressure in the occluded forearm venous segment in positive tilt position.)



Dr. (Capt.) Jerry Welbourne (OSU '56) of the nutrition section, Aerospace Medical Laboratory, performs acceptability and functional utility tests on the new developmental tubed foods in an altitude chamber.

Dr. Welbourne is responsible for the acceptability, feasibility, and functional utility testing of developmental foods.—WADC, Ohio.





Dr. (Capt.) James Prine (TEX '51), chief, of the veterinary pathology service for the Aerospace Medical Laboratory studies microscopic sections to evaluate tissue changes in relation to the experimental program.—WADC, Ohio.

Direct aid in experimental procedures includes:

- a. Control of animal subjects under an anesthesia.
- b. Assurance that treatment is humane

and in accordance with the "Rules Regarding Animal Care," established by the AMA.

- c. Provision of clinical service and laboratory tests to interpret the immediate effects of the imposed experimental conditions.
- d. Provision of clinical and laboratory postexperimental observations and care to determine continuing effects of experimental variables as well as postmortem examinations. (At each of the aerospace medical laboratories, veterinary pathologists perform necropsy examinations on all animals.)
- 5) The veterinarian is equipped to interpret and evaluate electrically recorded data. Since electrocardiograph potentials vary from one animal to another, the veterinarian must establish base-line data first and evaluate changes, making allowances for the animals' position and other variables.

For example, monkeys on a centrifuge subjected to 2g show irregularities in the EKG. After 24 hours at 2g, there is tachycardia. In another hour, there is bradycardia which becomes severe in 15 to 25 minutes and the animal would die shortly if the centrifuge is not stopped.

Dr. (Capt.) DePaul J. Corkhill (UP '47), chief, and Dr. (Capt.) Rudolph Hoffman (TEX '55), assistant chief of the operations and support section of the Aeromedical Field Laboratory, are shown engaged in the final checking of a new cosmic ray counter, which is designed to detect heavy primary cosmic ray particles.

Drs. Corkhill and Hoffman are radiologists as well as veterinarians. They are currently working on cosmic radiation in the field of biomedical and space biology problems. Both also have been monitoring the development of the University of Chicago's new cosmic ray counter. This latter counter is designed for measuring, recording, and telemetering radiation at any altitude.—

AFMDC, New Mexico.



Veterinarians as Principal Investigators

II—This second category wherein the veterinarian has assumed a role of importance is not as extensive as the former but is rated by Colonel Taylor as just as important. In this second category, the veterinarian acts as principal investigator of certain phases of biomedical research and he reports his work in the scientific literature. A broad understanding of biological disciplines especially qualifies the veterinarian in biomedical research which involves animals. In addition, this knowledge permits him to pursue specialized graduate education in a variety of subjects, particularly in biodynamics, bioacoustics, biochemistry, flight and space feeding, and radiobiology.

Veterinarians have served as investigators of acceleration in flight and also in using animals to measure physiological responses which can not be safely measured in human beings. The new procedures are first worked out using instruments, next the procedures are applied to animals, and then finally to man.

Veterinarians as Managers

III—A veterinarian can also act as an administrative manager of biomedical research and development. In this capacity, he is administrator and manager of biomedical research and development. This type of activity is limited to veterinarians with considerable experience in biomedical procedures.

Addendum

An Interesting Example of an Air Force Experiment

Colonel Taylor reported that on June 4, 1959, the Air Force staged an interdisciplinary experiment designed to put 4 black mice (C-57) into orbit and, subsequently, to achieve their recovery.

This detailed procedure for capsule assembly and checkout utilized an Air Force team consisting of a director, flight surgeon, physiologist, several veterinarians, and an electronics engineer.

A miniature transmitter was mounted in a small saddle affixed to the back of each mouse. Electrophysiologic signals generated from cardiac potentials were sensed through electrodes imbedded in thorax and abdomen, and a miniature coil mounted in each flank sensed respiratory and general body movements. Detectors located outside each of the four cages were tuned to the specific transmitter frequency selected for each mouse.

All 4 specimens lived through the entire flight, including more than 500 seconds of

weightlessness. At first-stage burnout, all animals became quite active, probably floating and kicking within their confined cages.

Upon ignition of the second stage, the same picture was repeated during the first few seconds of burning—the animals' activity increased substantially. Their movements lessened rapidly, however, with the force of acceleration which pressed the mice to the floors of their cages. This was followed by the greatest amount of movement in the zero-g field.

It was anticipated that the second stage would remain in polar orbit at an altitude of 150 nautical miles for 27 hours. Re-entry of the vehicle (with parachute employment) was intended to culminate in aerial recovery at 10,000 feet.

In spite of the fact that orbit was not achieved, and thus recovery not accomplished, much valuable information was obtained from the flight.

Dr. Traum in Select Group

When Dr. Jacob Traum (COR '05) received the Diploma of Honorary Associate of the Royal College of Veterinary Surgeons during opening ceremonies of the 96th Annual Meeting of the AVMA, he became the fifth holder of such a Diploma in the United States and Canada.

The four others who have been so honored are: Drs. W. A. Hagan, T. Lloyd Jones, C. A. Mitchell, and B. T. Simms.

It was recently learned that an honorary AVMA member, Dr. Franz Benesch of Austria, was also awarded the H.A.R.C.V.S. Diploma at a ceremony in Vienna in September, 1959.

National Institute of Animal Agriculture to Meet in April

The tenth anniversary meeting of the National Institute of Animal Agriculture is scheduled to meet April 3-5, 1960, at Purdue University in Lafayette, Ind.

The program includes discussions of pharmaceuticals, chemicals, and residues—topics of current interest to many.

S/CLAUDE HARPER, *Treasurer.*

Among the States and Provinces

Alabama

AUBURN—UNIVERSITY SPONSORS SHORT COURSE.—A postgraduate short course on spinal conditions of the dog will be offered by the Department of Small Animal Surgery and Medicine at Auburn University, March 16-18, 1960.

This short course will cover the anatomy, physiology, physical and radiographic diagnosis, and treatment of the various spinal conditions of the dog. Surgical correction of discs and spinal fractures will be emphasized.

Fee for the course will be \$50. A letter of application and a check made payable to Auburn University should be mailed to the above mentioned Department. If your application is not accepted because of a full class, your check will be returned. The maximum enrollment will be 12 persons.

S/B. F. HOEHLIN, *Head, Department of Small Animal Surgery & Medicine.*

California

DAVIS—UNIVERSITY ACCEPTS GRANT FROM AMERICAN CYANAMID.—The School of Veterinary Medicine at the University of California has recently accepted a grant from American Cyanamid Company to test chemotherapeutic agents for the control of pleuropneumonia-like organisms (PPLO) which cause infection in poultry.

The studies are under the direction of Dr. Henry E. Adler (WSU '46), who is working on the development of a PPLO vaccine against chronic respiratory disease (CRD) in chickens and infectious sinusitis in turkeys.

District of Columbia

WASHINGTON.—COLONEL TOWNSEND, NEW DIRECTOR AT AFIP.—Colonel Frank M. Townsend, USAF, MC, has been appointed director of the Armed Forces Institute of Pathology succeeding Capt. William M. Silliphant, USN, MC. Colonel Townsend is the first Air Force officer to assume the directorship of the Institute.

The Armed Forces Institute of Pathology is the central laboratory of pathology for the Department of Defense. In addition to serving the armed services, the Institute meets the needs of other federal agencies and civilian pathologists in the form of consultative service. It also contains a branch devoted to the study of veterinary pathology and has a Registry of Veterinary Pathology in its American Registry of Pathology.

Colonel Townsend graduated from the School of Aviation Medicine at Randolph Air Force Base, Texas, in 1950. In 1951, he established the first Air Force histopathology center at Lackland Air Force Base in San Antonio. He served there until 1954 when he became consultant to the Surgeon General of the Air Force. In 1955, he was named research advisor to the surgeon general. The same year, he was appointed AFIP's deputy director.

Missouri

ST. LOUIS—DR. M. J. HATTER, ASSISTANT IN MEAT INSPECTION IN ST. LOUIS STATION.—Below is pictured Dr. Melvin J. Hatter



Dr Melvin J. Hatter

(OSU '40) who became assistant inspector in charge of the St. Louis inspection station in February, 1959.

When the material was published on Dr. Hatter's predecessor, Dr. Melvin E. Hodgson who succeeded Dr. J. W. Hovorka upon the latter's retirement (see the JOURNAL, July 1, 1959, pp. 84-85), sufficient information was not available for a suitable write-up on Dr. Hatter.

Dr. Hatter is a native of Cleveland, Ohio. He went to St. Louis from Milwaukee, Wis., where he had served as assistant inspector for over three years. He is a member of the National Association of Federal Veterinarians.

New Jersey

BELVIDERE.—The Northwest Jersey Veterinary Society elected the following roster at its regular meeting on January 20: Drs. G. L. Smith, Jersey City, president; Robert L. Rost, Branchville, vice-president; and L. S. Nilsson, Jr., Belvidere, secretary-treasurer.

Dr. C. K. Jewel, chief, New Jersey Department of Agriculture, Bureau of Animal Diseases, Division of Animal Industry, discussed the epizootic of eastern viral encephalitis which plagued the state last summer, affecting pheasants, horses, and human beings.

s/L. S. NILSSON, *Secretary.*

New York

Drs. Dukes and Dye Honored at Cornell University



ITHACA.—Prof. Henry H. Dukes and Mrs. Dukes (center) and Prof. Joseph A. Dye and Mrs. Dye (left) are shown speaking with Dr. Donald A. Rankin, associate medical director of Squibb & Company, after a dinner meeting in their honor.

Portraits of Drs. Dukes and Dye were presented to the College by the alumni. Both are scheduled to retire in June—Professor Dukes after 27 years' service, Professor Dye after 36 years.

ITHACA—CORNELL OFFERS SUMMER LABORATORY COURSE.—A special summer laboratory course in techniques and applications of the electron microscope will be offered to qualified senior biologists and medical research workers under the direction of Prof. Benjamin M. Siegel at Cornell University's Electron Microscopy Laboratory. The session will run from June 13 through July 1, 1960.

Sponsored by a grant from the National Science Foundation, the course will include extensive laboratory work, lectures covering the basic principles and methods, and lectures on specific biological applications to be given by prominent guest speakers. Requests for information and applications should be addressed to Prof. Benjamin M. Siegel, Rockefeller Hall, Cornell University, Ithaca, N. Y.

Oregon

PORTLAND.—Television in Portland is only six years old, so it was a milestone when the Oregon V.M.A. entered its fourth year of presentation on KGW-TV's "Town and Country" show December 17.

The show is emceed by Mr. Ivan Jones who initiated veterinary interviews 11 years ago when he was a radio farm editor. His son, Dr. Pierre J. Jones (COL '58), is a practitioner in St. Helens.

When the program first originated, Mr. Jones interviewed a veterinarian every week for seven or eight minutes. This "quickie" program was discarded about three months ago in favor of the longer, more thorough "consultation-type" session, where one or



Television cameras have been aimed at the Oregon V.M.A. regularly for three years.

Ready for the fourth year, KGW-TV Farm Editor Ivan Jones (center) goes over plans for new programs with Dr. Don H. Holtzheimer (left) president of the Portland V.M.A., and Dr. Jim Adams (right) television chairman for the Oregon V.M.A.

more veterinarians draws up a chair beside Mr. Jones' roll-top desk for an informal discussion. Visual aids are used whenever possible.

There has been a wide range of subjects discussed. A recent show was devoted to the history of veterinary medicine, contrasting the old and the new.

Features have been done on pets and their care, and on the new pet owner's responsibilities. The state's diagnostic laboratory was also programmed. Saddle clubs, popular organizations in the West, have received the benefit of "Town and Country" advice. In addition, some public health aspect of veterinary medicine is discussed every fourth week.

Virginia

RICHMOND.—DR. ROUKEMA NAMED VETERINARIAN IN CHARGE OF ADE ACTIVITIES IN VIRGINIA.—Appointment of Dr. Edward C. Roukema (AU '40) as veterinarian in

charge of the USDA's Animal Disease Eradication activities in Richmond, Va., became effective in July, 1959.

He replaces Dr. Carl E. Boyd who was transferred to Ohio (see the JOURNAL, Feb. 15, 1960, p. 191). Dr. Roukema was formerly assistant veterinarian in charge of animal disease eradication activities in the Atlanta, Ga., office, a post he had held since July, 1956.

Born in Massachusetts, Dr. Roukema grew up in Florida and considers it his home state. He attended Alabama Polytechnic Institute and received his D.V.M. degree in 1940. With the exception of a short period of practice, Dr. Roukema has spent his professional career in the services of the USDA's ADE Division and the former BAI.

His first appointment was on the field force in Alabama, followed by field assignments in Florida, Georgia, and Tennessee. In 1952, Dr. Roukema was promoted to assistant veterinarian in charge in Tennessee and was transferred to Georgia in the same capacity in 1956.

In 1952, Dr. Roukema attended a special training course on the diagnosis of foreign animal diseases. Since that time, he has



Dr. Edward C. Roukema

made numerous field investigations of suspected vesicular conditions within the southeastern part of the United States. He also attended the sixth training in administrative management institute held in Athens, Ga., in March, 1959.

Veterinary Military Service

Texas

FORT SAM HOUSTON.—The first two veterinary officers to come to Brooke Army Medical Center from an allied nation are at the Army Medical Service School to study food inspection and food sanitation procedures.

They are Major Hassen Mohtashami and Captain Asghar Roshanai, both from Tehran, Iran.

Their previous experiences encompass the two major aspects of veterinary service in the Iranian Army Medical Service. Major Mohtashami has been largely concerned with furnishing horses for the Army's use since he entered active duty in 1945. His job just before coming to the United States was command of ten men who cared for some 2,000 wild mares, broke them, and delivered them to the Army. He has also had some experience with camels and mules, which are used in Southern Iran. His last post was at Tehran as chief of the Army Veterinary Hospital.

Captain Roshanai has been a veterinary food inspector since 1948, determining the acceptable quality of all foodstuffs for military personnel. He was assistant chief of the veterinary and food inspection section in the military college at Tehran.

This is the second time the two officers have worked together; the first was five years ago when they worked as food inspectors with two American veterinarians. They are both graduates of the veterinary school in Tehran.

Major Hassan Mohtashami and Capt. Asghar Roshanai, two Iranian officers, tour the veterinary food inspection section, Army Medical Service School at Fort Sam Houston. Demonstrating a foam-rubber model of a side of beef (separated into various cuts) is Lt. Col. Mulford C. Lockwood (left), assistant director of the Department of Veterinary Science. Colonel Daniel S. Stevenson, department director, is at right.



State Board Examinations

NORTH CAROLINA—June 20-22, 1960, Grove Park Inn, Asheville, N.C. Dr. James I. Cornwell, Secretary-Treasurer, North Carolina State Veterinary Examining Board, P.O. Box 9038, Asheville, N.C.

OHIO—June 6-8, 1960, Sisson Hall, College of Veterinary Medicine, Ohio State University, Columbus, Ohio. Applicants must be present at 8:00 a.m. on June 6. Dr. H. G. Geyer, Executive Secretary, Ohio Veterinary Medical Board, Ohio Departments Building, Room 720, Columbus 15, Ohio.

TEXAS—May 30-June 1, 1960, A. & M. College of Texas, College Station, Texas. The completed application must be received in the Board office not later than 30 days before the examination date. Mr. T. D. Weaver, Executive Secretary, Texas State Board of Veterinary Medical Examiners, 207 Capital National Bank Building, Austin 16, Texas.

WISCONSIN—June 27-28, 1960, Madison, Wis. Dr. A. A. Erdmann, Chief Veterinarian, State-Federal Cooperative Program, 6 West, State Capitol, Madison 2, Wis.

Deaths

Claude H. Kaylor (KCV '18), 62, Palmyra, Mo., died sometime in November, 1959.

John J. Maher (UP '90), 90, Philadelphia, Pa., died Dec. 3, 1959. Dr. Maher had practiced for over 50 years in Philadelphia.

Vincent Brown Wright (API '15), 67, Summerton, S.C., died Oct. 16, 1959, after suffering a heart attack. He had been in failing health for several years.

Dr. Wright, a retired Army major, had practiced in Fayetteville, N.C., before moving to Summerton.

Women's Auxiliary

Florida

TAMPA.—Mrs. Karl R. Owens, Gainesville, president, presided over the twelfth annual meeting of the Women's Auxiliary to the Florida V.M.A. in October, 1959.

Mrs. Van L. Bruns, Williston, was elected president of the Auxiliary for the coming year and Mrs. Peter Roy, Jacksonville, was chosen president-elect.

s/M. W. EMMEL, *Executive Secretary to the Florida V.M.A.*

Kansas

WICHITA.—The Women's Auxiliary to the Kansas V. M. A. held their annual meeting on Jan. 10-12, 1960, at the Hotel Broadview in Wichita.

On Monday morning, the members and guests heard a representative from the Patricia Stevens Charm School discuss poise. Luncheon featured a fashion show of spring millinery by leading designers and hats were modeled by Wichita Auxiliary members. Tiny hat boxes with dolls wearing frilly hats decorated the tables.

Mrs. F. H. Oberst, president, Manhattan, conducted the business meeting. The following officers were elected: Mrs. James A. Porter, Jr., Fredonia, president-elect; and Mrs. Gordon T. Jamieson, Wichita, secretary-treasurer. Mrs. T. J. Leasure, Lawrence, president-elect for 1959, is the auxiliary's new president.

Mrs. Marty McCreary, president of the Student Auxiliary at Kansas State University, reported on the activities of its 144 members.

Mrs. Leasure appointed the following officers: Mrs. Fred Ogilvie, Kansas City, historian; Mrs. L. W. Mohny, Pratt, parliamentarian; Mrs. K. M. Kurts, Kansas City, membership chairman. Mrs. A. L. Coates, Louisburg, public relations; and Mrs. K. B. Beeman, Frankfurt, liaison officer. Mrs. R. A. Thompson, Mrs. A. V. Schwartz, Mrs.

Carlyle Symms, Mrs. K. V. Kurts, and Mrs. A. W. Brecheisen were named delegates to the AVMA National Convention in Denver, Colo.

s/MRS. GORDON Z. (MARGARET) JAMIESON,
Secretary.

Michigan

EAST LANSING—M.S.U.'s STUDENT CHAPTER.—The members of the Women's Auxiliary to the AVMA Student Chapter in the College of Veterinary Medicine at Michigan State University began a busy year last fall.

A "New Wives' Tea" was held on October 4 in Giltner Hall and, on October 13, a representative of the Michigan Bell Telephone Company discussed "Telephone Answering and Facilities" at the term's educational meeting. On October 21, an informative movie on "Cancer" was presented by the Ingham County Cancer Society.

At the November social meeting, Dorothy Coussens reported on the AVMA's National Convention in Kansas City and Deborah Diener gave a resume of the Michigan V.M.A.'s meeting in Saginaw.

During the fall term, the Auxiliary voted to retain one sponsor and elect one new sponsor each year; each sponsor will serve two years. In addition, it decided to revise the constitution and have individual classes elect their own board members at a monthly class meeting.

On December 6, the group held a Christmas party for the children of the veterinary students instead of the annual faculty tea. *Giltner Glimpses*, the newsletter edited by the Auxiliary, was mailed around the holidays in December. In addition, both money-making projects, the rummage sale and the bake sale, were successful.

Coming events include a pot luck luncheon and cards, a travelog on Denver, installation ceremonies, a bohemian dinner and dance, and the senior tea.

s/MRS. C. B. (RENA) SMITH, *Corresponding Secretary.*

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1. Osborne, J. C. in *New Horizons in Chemotherapy. Proceedings of First Regional Conference on the Nitrofurans in Veterinary Medicine.* In press.

2. Bull, W. S.: *N. Amer. Vet.* 38: 3 (Jan.) 1957.

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WHAT IS YOUR *Diagnosis?*

Make your diagnosis from the picture below—then turn the page ►



Fig. 1 — Radiograph, medial view, of the left hindleg of the Boxer.

Fig. 2 — Radiograph, anteroposterior view, of the left hindleg.

History.—A female Boxer, 2½ years old, became slightly lame in the left hindleg. The leg was not tender and it was difficult to locate the injury, but it was thought to be a sprain of the stifle. Rest and salicylates were prescribed. During the next few weeks, the lameness gradually became worse but, because the dog was very active and difficult to control, trauma was still considered. When the leg was next examined, a tender, firm swelling was recognized just above the stifle. A radiograph was recommended but, before the owner could have this done, the dog suddenly became unable to use the leg and cried out with pain when the stifle was palpated. Radiographs of the stifle were taken (fig. 1 and 2).

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Fracture of the distal end of the femur as the result of extensive de-

struction of the bone, suggestive of tumor (fig. 3, A). Osteogenic activity and calcification in the soft tissue is limited to a small area posterior to the bone (fig. 3, B). (Histologically, this tumor was diagnosed as a primary reticulum cell sarcoma (lymphoma) of the bone.)

Comment.—The dog was euthanatized when the fracture and destructive lesion were found on the radiograph. The unusual amount of bone destruction immediately

(Diagnosis continued on adv. p. 36)

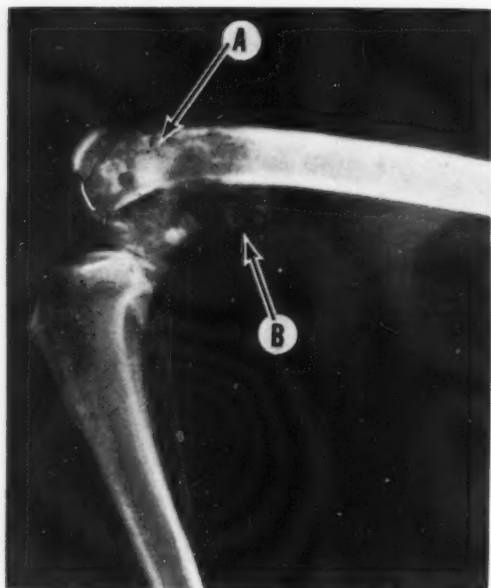


Fig. 3 — Radiograph, medial view, of the left hindleg of the Boxer showing fracture and an area of destruction (A), and calcium deposits in the soft tissue (B).

Fig. 4 — Sagittal section of the femur and tibia of the affected leg showing the area of the fracture and tumor (arrow).



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1. Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: *Vet. Med.* 51:413 (Sept.) 1956.

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Fourth Regional Conference on the Nitrofurans in Veterinary Medicine—April 1, 1960, Fairmont Hotel, San Francisco, California.

(continued from adv. p. 34)

suggested the lesion to be a tumor. Reticulum cell sarcomas of bone are rare. However, it was impossible to make a positive diagnosis from the radiological evidence alone, particularly in dealing with a rare tumor. In man, the incidence of this tumor is infrequent, only 70 being reported in 2,276 cases of bone tumors.¹ This is the first case we have encountered in any animal.²

Immediately when a bone tumor is suggested, an osteogenic sarcoma comes to mind because of its frequency, and any other lesion must be differentiated from it. The reticulum cell sarcoma has several characteristics which are not generally seen in the osteosarcoma. The most characteristic are the extension beyond the epiphyseal line, limited osteoblastic activity, and an invasion of the periosteum (fig. 4). In this case, the cortex of the bone was preserved (fig. 3) except in the area of the fracture (fig. 4, arrow).

Lymphomas of the bone are said to metastasize early. The popliteal lymph node was not preserved for sectioning.

Reference

¹Dohlin, D. C.: Bone Tumors. Charles C Thomas, Springfield, Ill. (1959): 104-113.

²Riser Animal Hospital, Skokie, Ill., hospital records.

This report was submitted by Wayne H. Riser, D.V.M., M.S., Kensington, Md., and J. Kenneth Bone, B.V.Sc., Chicago, Ill.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

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Agalactia and Acetonemia in Sows

Primary agalactia, characterized by empty mammary glands, seems to occur rarely in sows. It has not responded to pituitary extract. Among the so-called "secondary" agalactias, puerperal septicemia is most important. It is difficult to distinguish from hypocalcemia except by the swollen mammary glands.

Acetonemia, either ante- or postpartum, probably occurs more frequently than diagnosed, especially in fat sows. The clinical signs are similar to those of agalactia. There is marked somnolence which often becomes a coma. Tests show the presence of acetone and sometimes of albumin in the urine. It most frequently occurs in sows fed mainly a starch and albumin diet, such as potatoes and skim milk powder. In one such case, a fat sow in advanced pregnancy, which had been sleeping two days, failed to respond to intravenous calcium and caffeine therapy. At necropsy, her liver was yellow, dystrophic, and brittle; both kidneys were markedly yellow. Acetonemia in sows is treated with sodium propionate solution (1/3 of the dose for a cow), together with milk given by stomach tube if the animal is not eating.—*H. Uray in Wien. tierärztl. Monatschr. (Feb., 1959): 200.*

Poisoned Rats Dangerous

Since the amount of sodium fluoroacetate (compound 1080) left in the dried carcass of a single rat can often kill a dog, the necessity for prompt and proper disposition of a dead or dying rodent is obvious.—*J. Am. M. A., 171, (1959): 1905.*

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Exclusive Publication.—Articles submitted for publication are accepted with the understanding that they are not submitted to other journals, which is ethical publication procedure.

Manuscripts.—Manuscripts, including footnotes, references, and tables, must be typewritten, double-spaced, on 8½- by 11-in. bond paper, and the original and one carbon copy, submitted. One-inch margins should be allowed on the sides, with 2 in. at top and bottom. Articles should be concise. Short, simple sentences are clearer and more forceful than long, complex ones.

Illustrations.—Photographs should be furnished in glossy prints, and of a size that will fit into the JOURNAL of the American Veterinary Medical Association with a minimum of reduction. Photomicrographs which can not be reduced should be marked for cropping to 1-column or 2-column width. Identifying marks within the photomicrographs, such as arrows, letters, or numbers, should be clearly marked with black India ink or white opaque ink to insure good contrast for reproduction and must be large enough to stand reduction, if necessary.

Drawings, graphs, and charts should be made clearly and accurately in India ink on white paper and a glossy print of them submitted when possible. Numbers or letters appearing on graphs or charts should be large enough to allow for any reduction necessary for the chart or graph to fit JOURNAL pages. Blue lines in graph paper drop out in reproduction; therefore, if lines are required they must be drawn in black ink. All illustrations should bear the name of the author and the illustration number on the back.

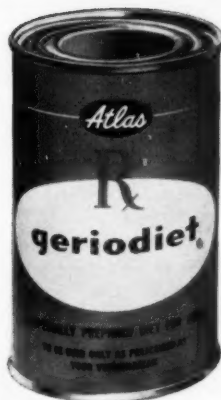
Tables.—Tables should be simple and typed double space. Complex tables are not conducive to perusal. It is wiser to summarize complex material than to tabulate it.

References.—References should be typed double space, in alphabetical order, and should be prepared in the following style: name of author, title of article, name of periodical with volume, year, and page numbers. References to journals not commonly known should give the complete name of the periodical, and where published so that they may be added to our reference files. When books are cited, the name of publisher, location, edition, and year should be given.



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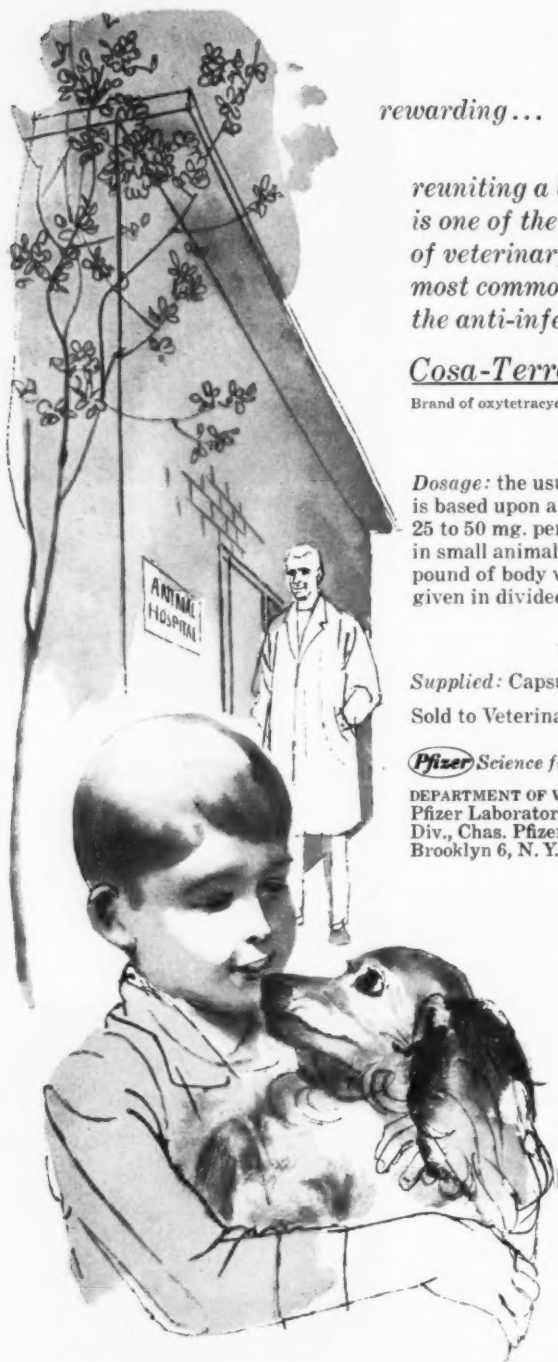
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History of the AVMA

The meetings for 1881 were again held at Young's Hotel and at the American Veterinary College. The newly-elected officers were: president, Williamson Bryden; vice president, Lachlan McLean; secretary, C. B. Michener; and treasurer, Charles Burden.

At the Boston meeting, a letter from A. A. Holcombe was read, describing the status of the Army veterinary service, and "asking the support of the Association in making the veterinarian's position in the army what it should be." As a result, a Committee on Army Legislation was appointed. Although it may be doubted that this first committee exercised much influence, it was the beginning of Association efforts on behalf of the Army veterinary service.

The now-perennial matter of Liautard's resignation as editor of the *Review* was brought up, and as reported by the Secretary, C. B. Michener: "In view of the increasing demands made upon the time of the editor of the *American Veterinary Review*, the society decided to present the journal to Prof. A. Liautard, without any encumbrance, as a slight recognition of the work he has done for the Association and profession at large."

In commenting on this matter, F. S. Billings notes: "In a certain way the *Review* has changed hands. It has been the organ of the profession through its Association. It is that no longer. With the late meeting in Boston this connection ceased. The *Review* has passed into the hands of Dr. Liautard. He alone must shoulder the whole burden. In this there is no change, for he has always carried this burden too much alone. Too much of the work of not only editing, but supplying the material for its pages, had devolved upon him. This reflects upon the profession. They are willing to pay for education, but not willing to mutually contribute to edify and educate one another."

What the real motives of Liautard or the Association may have been in this matter are, perhaps, not ascertainable. Certainly, the claim of Liautard that it was the other demands on his time that prompted his resignation is hardly consistent with his acceptance—most willingly—of full responsibility for the *Review*. And while the journal was in sound financial condition, it could hardly have been calculated to add much to his private fortune; rather, it

was a potential liability. Taking Billings' statement at face value, it is likely that the Association had little choice in the matter.

In three years the *Review* had become a more powerful influence than had the Association in the 18 years of its existence—something which Liautard well recognized. Moreover, with the *Review* as a private enterprise, he had no obligation to follow Association policy, and—for the undoubted benefit of the Association—he became one of its strongest critics, but in a constructive manner. Taking everything into consideration, it would seem feasible to postulate that Liautard wanted the prestige and freedom of action this move gave him. Earlier, he had to depend upon annual re-election as editor—a tenuous position at best.

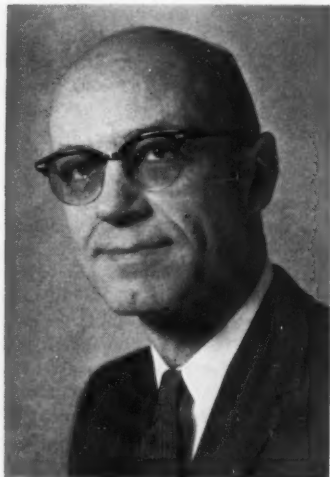
In one of his first pointed rebuffs, Liautard charges: "This association has now been in existence for eighteen years, and what work of any advantage to the profession can it boast of? . . . the profession is said to count about seven or eight hundred members in its ranks, and yet the USVMA counts only sixty-eight members . . . Are the conditions of admission so rigid that any worthy practitioner cannot be admitted? Why is it that the meetings are so deficient in professional discussions, and so lamentably remarkable for the absence of papers of acknowledged importance?"

Concerning the annual meeting, Liautard later notes: ". . . while some sixty-five representatives of the profession can claim membership in the Association, but twenty-five were present, and of these only four belonged to States outside of New York. . . and [little] was done worthy of the Association . . . why is this so? . . . the fault lies principally with its officers. . . [but] let us also ask every member in particular, if he has done his whole duty towards the Association."

Liautard's criticism is perhaps a little too harsh. The USVMA had petitioned for legislation aimed toward the eradication of animal diseases, and while there seems not to have been continuing pressure from the Association itself, a number of its prominent members were active in prosecuting the cause. Certainly, it was the work of these men which in large part laid a substantial framework for the eventual establishment of the Bureau of Animal Industry.

Dr. L. Meyer Jones Now at AVMA Office

Dr. L. Meyer Jones has joined the central office staff of the AVMA as Director of Scientific Activities. He will serve as staff consultant to the Council on Research and to the Council on Biologic and Therapeutic Agents and will be assistant editor of the *American Journal of Veterinary Research*. His duties will include



Dr. L. Meyer Jones

liaison with the drug regulatory agencies of the federal government, with pharmaceutical and biologic manufacturers, and with other professional organizations.

Born on a dairy farm near Hartford City, Ind., Dr. Jones received an A.B. degree in zoology from DePauw University in 1935. In the same year, he became a student and teaching-assistant in the College of Veterinary Medicine at Iowa State University. He received the D.V.M. degree and the M.S. degree in veterinary physiology from the same institution in 1939.

Dr. Jones was the first Fellow of the Research Council of the American Veteri-

nary Medical Association. His research dealt with sulfonamide chemotherapy in calf pneumonia. He received the Ph.D. degree in pharmacology from the University of Minnesota in 1945. During this same year, he was appointed to the position of professor in the Department of Veterinary Physiology and Pharmacology at Iowa State University.

He has been active in affairs of the AVMA, serving on the Post-War Planning Group, the National Formulary Committee on Veterinary Items, and the Committee on Therapeutic Agents both as member and chairman. Currently, he is chairman of the Council on Biologic and Therapeutic Agents.

Dr. Jones served as Fulbright Lecturer in Pharmacology in 1953-1954 at the Tierärztliche Hochschule in Vienna, Austria. During this period, he served as guest lecturer at the Royal Veterinary College at Copenhagen, Denmark, and visited many of the veterinary schools and research laboratories in western Europe.

He is a member of the American Society for Pharmacology and Experimental Therapeutics, American Society of Veterinary Physiology and Pharmacology, American Veterinary Medical Association, Research Workers in Animal Diseases, New York Academy of Science, the Iowa Veterinary Medical Association, Phi Kappa Phi, Sigma Xi, and Phi Zeta.

Dr. Jones is author of the textbook "Veterinary Pharmacology and Therapeutics," now in its second edition, and has been author or co-author of many articles in scientific journals. He is actively engaged in research on the therapeutic and toxicologic use of various drugs in domestic animals. Areas of special interest have included sulfonamides, rodenticides, muscle relaxants, local anesthetics, and tranquilizing drugs.

Dr. Jones married Mary Elizabeth Homer of Hartford City, Ind. They have three children—Larry, Ronald, and Charlotte. The family will move to a suburb of Chicago after the close of the school year.



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Foals, 2 cc.; Horses, 5 cc.

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AVMA Organizes Veterinary Specialty Advisory Board

Meeting in Chicago Dec. 6 to 8, 1959, the AVMA Council on Education recognized the newly formed Advisory Board on Veterinary Specialties. The members of the Board and the organizations they represent are: Drs. Dennis Sikes, Athens, Ga., and R. E. Rebrassier, Columbus, Ohio, National Board of Veterinary Medical Examiners; Drs. W. J. Zontine, Lancaster, Calif., and E. R. Walker, Pawhuska, Okla., Association

At its first meeting, held in Chicago on February 20, the Board considered the application of the American College of Veterinary Toxicologists.

After reviewing correspondence pertaining to the formation of an Institute of Veterinary History at Michigan State University, the Council endorsed the establishment of such an institute.

The Council considered the background



Members of the AVMA Council on Education at a meeting of the newly formed Advisory Board on Veterinary Specialties

Seated (left to right)—Colonel W. E. Jennings, Drs. H. J. Stafseth, T. L. Jones, and Niel W. Pieper.

Standing—Drs. Wayne H. Riser, H. L. Marsh, J. E. Greene, W. G. Magrane, C. K. Mingle, and S. H. McNutt.

of American Boards of Examiners in Veterinary Medicine; Drs. I. A. Merchant, Ames, Iowa, and W. R. Krill, Columbus, Ohio, Association of Deans of American Colleges of Veterinary Medicine; Drs. H. J. Stafseth, East Lansing, Mich., and Col. W. E. Jennings, Chicago, Ill., Council on Education, AVMA; Drs. C. R. Cole, Columbus, Ohio, and T. C. Jones, Boston, Mass., American College of Veterinary Pathologists; Drs. L. R. Davenport, Springfield, Ill., and John H. Helwig, Columbus, Ohio, American Board of Veterinary Public Health; Drs. B. D. Fremming, Pittsburgh, Pa., and B. H. Skold, Silver Springs, Md., American Board of Laboratory Animal Medicine.

This new Board, which will advise the Council, will no doubt influence the direction veterinary medicine will take regarding specialization.

of developments in nomenclature of animal diseases and discussed with Dr. D. K. Sorensen of St. Paul, the activities of the American Association of Veterinary Clinicians in this respect. As a result, the Council will recommend that the AVMA Executive Board adopt the standard nomenclature of animal diseases and surgical procedures. It is planned that the Council will establish an advisory committee of clinicians to implement the use of standard nomenclature, with its membership to be determined by the A.A.V.C.

The following were elected as officers of the Council: Drs. T. L. Jones, Guelph, Ont., chairman; H. J. Stafseth, East Lansing, Mich., vice-chairman; and Col. W. E. Jennings, Chicago, secretary. The next meeting will be held April 9 and 10 in Chicago.

APPLICATIONS

Applicants Not Members of Constituent Associations

In accordance with paragraph (c) of Section 1, Article I, of the Bylaws, the names of applicants who are not members of constituent associations shall be published in the JOURNAL. Written comments received by the Executive Secretary from any active member regarding the application as published, will be furnished to the Judicial Council for its consideration prior to acceptance of the application.

SANDERCOCK, ROGER FREEMAN GALE
The Evans Biological Institute
Runcorn, Cheshire, England
M.R.C.V.S., Royal Veterinary College, 1942
Vouchers: J. F. D. Tutt and J. G. Hardenbergh

Dogs on Duty

A 6.5 per cent drop in the city's crime rate is the boast of Baltimore, since adding 21 canine "cops" to the force just over a year ago.

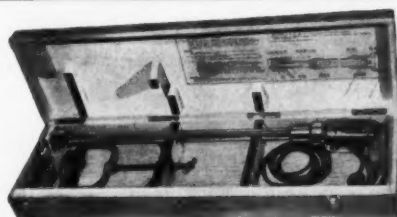
At Vaduz, Liechtenstein, 1 dog, 1 sergeant, and 7 officers maintain public order.

In Canada's Far North, the Royal Canadian Mounties have found companionship and genuine assistance from dogs in police and sled work. Dogs were added to the staff in 1936.

Cocoa, a German Short-Haired Pointer, herds and guards 20,000 turkeys on the Jacobson's turkey farms at Watertown, S. D. More than 100 different breeds of dogs perform valuable services in herding and driving cattle, sheep, poultry, reindeer, and dromedaries throughout the world.

The first "police dog" to be commemorated in a painting is a Schnauzer portrayed with a night patrolman. The scene was Stuttgart, Germany; the year, 1620.—*Dogs in Canada*, 50, (Jan., 1960):70.

Svend Anderson's dog earns about \$50,000 a year. In the past eight years, Rolf, an 11-year-old German Shepard Dog on the Danish island of Funen, has discovered more than \$400,000 worth of tools, clothing, jewelry, currency, musical instruments, and other animals. Rolf's keen nose has sought out items which were encased in ice, mired in bogs, and floating on rivers. Svend quotes his dog's fee at about \$4 an assignment.—*Dog World* (Oct., 1959).



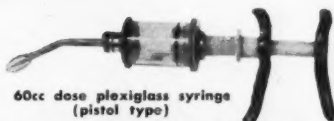
Gastrotomy instruments ▶



Electric dental float



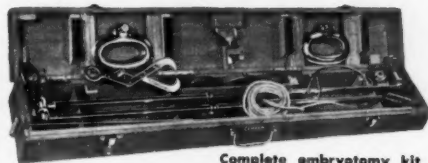
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(pistol type)



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Cleveland Columnist Sparks Formation of Pet Forum

Since December, 1959, Maxwell Riddle, reporter, pet editor, and columnist for the *Cleveland Press*, has been devoting one of his local *Kennel and Leash* columns a month to the Cuyahoga County (Ohio) VMA—Western Reserve Kennel Club Pet Forum. *Kennel and Leash* is syndicated in ten major newspapers with circulation in Cleveland, Denver, Houston, St. Paul, Memphis, Columbus, Cincinnati, Boston, Toronto, and Ottawa, and several other cities.

Mr. Riddle is a past president of the Western Reserve Kennel Club. Being a dog

breeder, he has long been interested in veterinary medicine. In 1957, he wrote reports for the *Press* on the scientific sessions from the 94th AVMA Annual Meeting held in Cleveland.

Mr. Riddle first suggested the Pet Forum in one of his letters to the AVMA. He then contacted Dr. Harry Roberts, recently elected member of the AVMA Executive Board from District IV, and a Cleveland practitioner. Dr. Roberts arranged for Mr. Riddle to attend the October meeting of the local association. Mr. Riddle presented his ideas to Dr. Frank Coy, CCVMA president, and the organization members. The veterinarians unanimously approved the ideas and set up a committee, headed by Dr. Cameron, to cooperate with the Kennel Club. The committee selected topics and suggested speakers from the veterinary membership.

The first panel was held December 8 in Cleveland. Participating veterinarians included Dr. R. E. Jacobs speaking on Distemper, Dr. R. D. Daniels on Infectious Canine Hepatitis, and Dr. Wallace E. Wendt on Leptospirosis. Dr. Roger Grundish was moderator for all sessions.

Western Reserve Kennel Club members were enthusiastic after the first forum, according to Mr. Riddle.

Highlights of the veterinarians' remarks on pet diseases and their prevention are used by Mr. Riddle in his column. Personal contact between veterinary associations and kennel clubs is a worthwhile public relations activity, and through publicity, the information exchanged reaches a much wider audience than just club members or participants.

A similar forum was held last year by the El Paso County (Texas) Veterinary Medical Association, sponsored by their local newspaper.



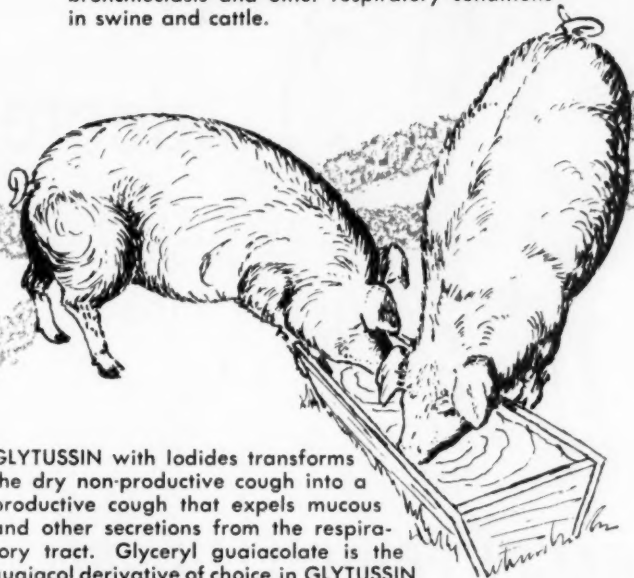
4
Mr. Maxwell Riddle, *Cleveland Press* reporter and member of the Western Reserve Kennel Club, confers with Dr. Frank Coy, president, Cuyahoga County (Ohio) Veterinary Medical Association, on a technical point in a non-professional magazine. Mr. Riddle is author of *Kennel and Leash*, a syndicated pet column. The Kennel Club and VMA work together on a forum which Mr. Riddle reports in his articles.

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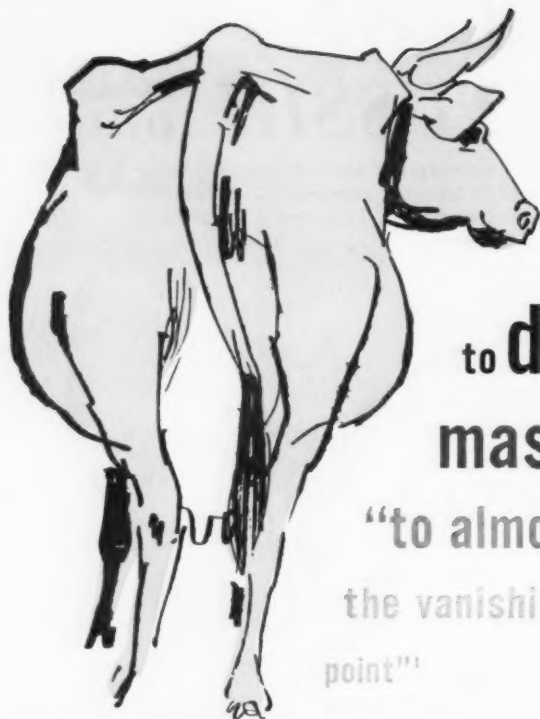


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1. Kakavas, J. C., et al.: *J. Am. Vet. M. Ass.* 119:203 (Sept.) 1951.



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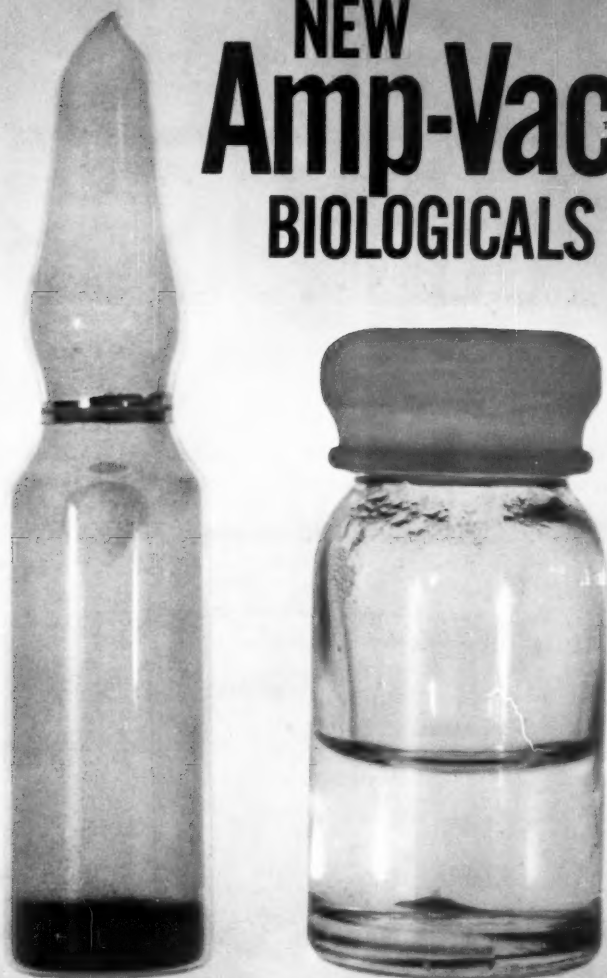
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COMING MEETINGS

Notices of coming meetings must be received 30 days before date of publication.

Indiana Veterinary Medical Association and Vita Vet Laboratories. Third symposium on therapeutic nutrition. State Board of Health Building, Indianapolis, March 4, 1960. E. E. Slatter, Box 108, Marion, Ind., chairman.

New Jersey Veterinary Medical Association. Seventy-sixth annual meeting. Hotel Claridge, Atlantic City, March 30-31, 1960. John R. McCoy, 236 Highway 18, East Brunswick, N. J., secretary.

Alabama Veterinary Medical Association. Annual meeting. Battle House, Mobile, April 3-5, 1960. M. K. Heath, School Veterinary Medicine, Auburn University, Auburn, Ala., secretary.

National Institute of Animal Agriculture. Tenth annual meeting. Purdue University, Lafayette, Ind., April 3-5, 1960. Claude Harper, Department of Animal Science, Purdue University, Lafayette, Ind., treasurer.

Florida, University of. Third annual conference for veterinarians. University of Florida, Health Center Auditorium, April 30-May 1, 1960. W. R. Pritchard, Head, Department of Veterinary Science, University of Florida, Gainesville.

Kansas State University. Twenty-second annual conference. School of Veterinary Medicine, Kansas State University, Manhattan, May 19-21, 1960. Donald C. Kelley, chairman.

Mississippi State Veterinary Medical Association, Inc. Annual meeting. King Edward Hotel, Jackson, June 19-21, 1960. Joseph W. Branson, P. O. Box 4223, Fondren Sta., Jackson, Miss., secretary-treasurer.

California Veterinary Medical Association. Seventy-second annual meeting. Jack Tar Hotel, San Francisco, Calif., June 26-29, 1960. Mr. Ken Humphreys, 3004 16th St., San Francisco 3, Calif., executive secretary.

Virginia Veterinary Medical Association. Summer meeting. Shoreham Hotel, Washington, D.C., July 17-19, 1960. G. B. Estes, State Office Building, Richmond, Va., secretary-treasurer.

Auburn University. Fifty-third annual conference for veterinarians. School of Veterinary Medicine, Auburn University, July 24-27, 1960. J. E. Greene, dean.

American Veterinary Medical Association. Ninety-seventh annual meeting. Denver-Hilton Hotel, Denver, Colo., Aug. 15-18, 1960. H. E. Kingman, Jr., 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Fourth International Congress on Animal Reproduction. The Hague, Netherlands, June 5-9, 1961. For additional information contact: the Secretariat of the Fourth International Congress on Animal Reproduction, 14, Burgemeester de Monchyplein, The Hague, Netherlands, Dr. L. Hoedemaker, secretary to the organizing committee.

Eighth International Congress of Animal Husbandry. Hamburg, Germany, June 13, 1961.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Medical Association, the first Thursday of each month. James L. Chambers, 4307 Normanbridge Rd., Montgomery, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. Dan P. Griswold, Jr., 714 S. 39th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. Cecil S. Yarbrough, 4121 U.S. 90 West, Mobile, Ala., secretary.

North Alabama Veterinary Medical Association, the second Thursday of November, January, March, May, July, and September, in Decatur, Ala. Ray A. Ashwander, P.O. Box 1767, Decatur, Ala., secretary.

Northeast Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ALASKA—Anchorage Group of the Alaska V. M. A., the last Wednesday of each month at Fort Richardson Officers' Club or Thompson's Restaurant, 6th and I Streets, Anchorage, Alaska. Lt. Colonel E. H. Akins, Surgeon's Office, USARAL, Fort Richardson, Alaska, secretary to the Alaska V. M. A.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. John D. Clark, 518 West Oak St., Scottsdale, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. Gwyn Chapin, 2215 E. Calle Vista, Tucson, Ariz., secretary.

ARKANSAS—Pulaski County Veterinary Medical Society, the second Tuesday of each month. Harvie R. Ellis, 54 Belmont Drive, Little Rock, Ark., secretary-treasurer.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of every month. L. M. Proctor, 24 Meadow Lane, Concord, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16th St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Paul S. Chaffee, 2333 McKinley Ave., Fresno, Calif., secretary.

Humboldt-Del Norte Counties Veterinary Medical Association, the second Tuesday of January, May, September, and November. Dr. M. Lunstra, P. O. Box 734, Eureka, Calif., secretary-treasurer.

Foreign Meetings

International Association of Veterinary Food Hygienists. Second Symposium. Basel, Switzerland, May 15-21, 1960. Dr. A. Clarenburg, 1, Sterrenbos, Utrecht, The Netherlands, president.

International Congress of Physio-Pathology of Animal Reproduction and Artificial Insemination, Amsterdam, Netherlands, June 13-17, 1960. Dr. J. Edwards, Milk Marketing Board, Thames, Surrey, England.

First International Congress of Endocrinology. Technical University of Denmark, Copenhagen, July 18-23, 1960. Dr. Christian Hamburger, Statens Seruminstitut, Copenhagen S, Denmark, chairman of the executive committee.



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Kern County Veterinary Medical Association, the first Thursday evening of the month. Francis Dawson, 2007 Nile St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of each month. William P. Matulich, P. O. Box 121, San Luis Obispo, Calif., secretary-treasurer.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. V. Todorovic, 47 Mann Ave., Watsonville, Calif., secretary.

Northern California Association of Veterinarians, the second Tuesday of the month. George Crenshaw, 1137 8th St., Orland, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell in Modesto, Calif. Kenneth E. Erwin, Box 841, Manteca, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. K. R. Wilcox, P.O. Box 98, Upland, California, secretary-treasurer.

Orange County Veterinary Medical Association, the third Thursday of each month. H. M. Stanton, 1122 S.E. U.S. Highway 101, Tustin, Calif., secretary.

Peninsula Veterinary Medical Association, the third Tuesday of the month. Arthur L. Gilger, 2905 South El Camino Real, San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of the month. R. R. Rediske, 833 Valjejo Ave., Novato, Calif., secretary-treasurer.

Sacramento Valley Veterinary Medical Association, the second Thursday of each month with the location specified monthly. Eugene C. Story, 4819 "V" St., Sacramento 17, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of the month. Robert F. Burns, 7572 North Ave., Lemon Grove, Calif., secretary-treasurer.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Barbara G. Shirley, Canoga Park, Calif., secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, Calif., secretary.

San Francisco Veterinarians, every other month—meetings decided at previous sessions. J. Wachs, 317D Sacramento St., San Francisco, Calif., secretary-treasurer.

Santa Barbara-Ventura Counties Veterinary Medical Association, every three months, no set date. Gerald M. Clark, 5415 8th St., Carpinteria, Calif., secretary-treasurer.

Santa Clara Valley Veterinary Medical Association, the last Tuesday of the month. Robert L. King, 1269 Grant St., Santa Clara, Calif., secretary-treasurer.

Southern California Veterinary Medical Association, the third Wednesday of the month. Mr. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

Tulare County Veterinary Medical Association, the second Thursday of each month at the Tagus Ranch, Tulare. Larry A. Jackson, 12191 Lacey Blvd., Hanford, Calif., secretary-treasurer.

COLORADO—Denver Area Veterinary Medical Society, the fourth Tuesday of every month. Gene M. Bierhaus, 2896 S. Federal Blvd., Englewood, Colo., secretary-treasurer.

Northern Colorado Veterinary Medical Society, the first Wednesday of each month, in Fort Collins. E. J. Carroll, Dept. of Clinics and Surgery, Colorado State University, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Medical Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. A. P. Mayer, Jr., R.F.D. 2, Newark, Del., secretary-treasurer.

DISTRICT OF COLUMBIA—District of Columbia Veterinary Medical Association, the second Tuesday evenings of January, March, May, and October. R. B. Gochenour, 10109 Ashwood Dr., Kensington, Md., secretary-treasurer.

FLORIDA—Big Bend Veterinary Medical Association, meets the first Sunday of each month at 5:00 p.m. at the Tallahassee Dining Room, Tallahassee. Mrs. Robert E. Lee, P.O. Box 3236, Tallahassee, Fla., acting secretary.

Central Florida Veterinary Medical Association, the first Friday of each month at 8:00 p.m.; place specified monthly. William L. Sippel, P.O. Box 847, Kissimmee, Fla., secretary.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg. S. H. Carr, P.O. Box 1206, Dunedin, Fla., secretary.

Hillsborough Veterinary Medical Society, the second Monday of every month; time and place are specified monthly. J. H. Rogers, 311 N. Ben Avon Dr., Tampa, Fla., secretary-treasurer.

Jacksonville Veterinary Medical Association, the first Thursday of every month at the Green Turtle Restaurant, at 8:00 p. m. Edwin G. Clappett, 5150 Love Grove Rd., Jacksonville 7, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month; time and place specified

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monthly.; David B. Aronson 923 Belair Road, Pensacola, Fla., secretary.

Palm Beach Veterinary Society, the last Thursday evening of each month. McArthur Dairy Building, Four Points, W. Palm Beach. D. L. Lichty, 700 Hollywood Place, West Palm Beach, Fla., secretary.

Pinellas County Veterinary Society, the first Monday of January, February, April, May, July, August, October, and November at the Fort Harrison Hotel, Clearwater, Fla., at 7:30 p.m. L. H. Sellers, Jr., 3813 Tyrone Blvd., St. Petersburg, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. John S. Haromy, Route #1, Box 107-A, Lake Wales, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month; time and place specified monthly. E. J. Gissendanner, 1665 N.E. 123rd St., North Miami, Fla., secretary.

Suwannee Valley Veterinary Medical Association, meets each fourth month; time and place specified quarterly. G. L. Burch, P.O. Box 405, Ocala, Fla., secretary.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. Robert E. Cope, 127 E. Mason, Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Medical Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Richard Montgomery, P.O. Box 222, Morrow, Ga., secretary-treasurer.

East Georgia Veterinary Medical Association, quarterly, date and meeting place varies. Hugh F. Arundel, P.O. Box 153, Statesboro, Ga., secretary.

Georgia-Carolina Veterinary Medical Association, the second Monday of each month at 8:00 p.m., at the Town Tavern, Augusta, Ga. James M. Hawk, 700 E. Buena Vista Ave., North Augusta, S. C., secretary.

North Georgia Veterinary Medical Association, quarterly, no set date, the spring meeting at the Veterinary School, Athens, Ga. S. J. Shirley, Commerce, Ga., secretary.

South Georgia Veterinary Medical Association, the second Sunday of each quarter at 3:30 p.m., at the Radium Springs Hotel, Albany, Ga. M. W. Hale, Route 2, Tifton, Ga., secretary.

ILLINOIS—Central Illinois Veterinary Medical Association, June 9, Sept. 9, and Dec. 10, 1959. Howard Bennett, 120 W. Jefferson St., Petersburg, Ill., secretary-treasurer.

Chicago Veterinary Medical Association, the second Tuesday of each month, Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

INDIANA—Calumet Area Veterinary Medical Association, the first Thursday of each month. Bruce Sharp, Box 166, Hobart, Ind., secretary-treasurer.

Central Indiana Veterinary Medical Association, the second Wednesday of each month. P. T. Parker, 224 N. Mill St., Plainfield, Ind., secretary-treasurer.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. Stanton Williamson, 217 W. Chippewa St., South Bend, Ind., secretary.

Northwestern Indiana Veterinary Medical Association, the fourth Thursday of each month, except August, January, and February. Harvey R. Smith, R.R. 2, Box 30, Lowell, Ind., secretary-treasurer.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July,

August, and October in Black's Tea Room, Waterloo, Iowa. E. L. Koch, Plainfield, Iowa, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month except June, July, and August at 6:30 p.m., Breeze House, Ankeny, Iowa. S. L. Hendricks, secretary-treasurer.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at Bradford Hotel, Storm Lake, at 7:30 p.m. V. R. Howie, Manson, Iowa, secretary.

East Central Iowa Veterinary Medical Association, the third Thursday of each month at 6:30 p.m., usually at the Hotel Roosevelt in Cedar Rapids, Iowa. T. F. Bartley, P.O. Box 454, Cedar Rapids, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. M. F. Frevert, West Union, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Building, Sheldon. Warren Verploeg, Paulina, Iowa, secretary.

Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant. H. D. McCreedy, Ottumwa, Iowa, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs. F. S. Sharp, Red Oak, Iowa, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at All Vets Center, Clear Lake, at 7:00 p.m. Delmar Diercks, Rockwell, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. R. H. Folsom, P.O. Box 323, Danville, Ky., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday of each month in Louisville or within a radius of 50 miles, except January, May, and July. G. R. Comfort, 2102 Reynolds Lane, Louisville, Ky., secretary-treasurer.

LOUISIANA—New Orleans Veterinary Medical Association, the third Thursday of every month at the Monteleone Hotel, New Orleans, at 8:30 p.m. Ronald C.

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Francis, 6421 Chef Menteur Highway, New Orleans, La., secretary-treasurer.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Leonard D. Krinsky, 6111 Hartford Rd., Baltimore, Md., secretary.

MICHIGAN—Central Michigan Veterinary Medical Association, the first Wednesday of every month at 7 p.m. Jerry Fries, 2070 E. Main St., Owosso, Mich., secretary.

Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert W. Acton, 4110 Spring Rd., Jackson, Mich.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. Alvin R. Conquest, P.O. Box 514, Grand Blanc, Mich., secretary.

Southeastern Michigan Veterinary Medical Association, the fourth Wednesday of every month, September through May. Louis J. Rossoni, 24531 Princeton Ave., Dearborn 8, Mich., secretary.

MINNESOTA—Lake Region Veterinary Medical Association, quarterly meetings, with time and place specified prior to each meeting. J. A. Strache, Battle Lake, Minn., secretary-treasurer.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kan., secretary.

NEVADA—Western Nevada Veterinary Society, the first Tuesday of each month. Paul S. Silva, 1170 Airport Road, Reno, Nev., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, R.D. 1, Box 284A, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April, except December, at the Irvington House, 925 Springfield Ave., Irvington, N.J. Bernard M. Weiner, 787 Clinton Ave., Newark, N.J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Elks Club, Hackensack. James R. Tanzola, Upper Saddle River, N.J., secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. L. S. Nilsson, Jr., 224 Hardwick St., Belvidere, N. J., secretary-treasurer.

Southern New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collmont Diner, Collingswood, N.J. Jay Simmons, 247 South White Horse Pike, Audubon, N. J., secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, the third Wednesday of each month, Fez Club, Albuquerque. Donald W. Fitzgerald, 1525 Lomas Blvd., N.E., Albuquerque, N.M., secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St.,

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REFERENCES: 1. Vigue, R. F.: J.A.V.M.A. 133:326 (Sept. 15) 1958. 2. Vigue, R. F., Fitzgerald, W. H., and Castrucci, R. F.: Vet.Med. 54:129 (March) 1959.

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Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 40 Meredith St., Rochester 9, N. Y., secretary-treasurer.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. W. A. Sumner, 3741 High Point Rd., Greensboro, N.C., secretary.

Eastern North Carolina Veterinary Medical Association, the last Tuesday evening of each month, time and place specified monthly. Byron H. Brow, Box 453, Goldsboro, N. Car., secretary-treasurer.

Piedmont Veterinary Medical Association, the last Friday of each month. J. G. Martin, Boone, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the third Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Asheville, N. Car. H. A. Justus, 924 Lakeside Dr., Hendersonville, N. Car., secretary.

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OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Rd., Ronald A. Meeks, 11081 Springfield Pike, Cincinnati 15, Ohio, secretary.

Clark County Veterinary Medical Association, meetings held quarterly; time and place irregular. R. Edmondson, South Charleston, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, the third Thursday of every month, September through May; place irregular. R. W. Vesper, 1481 Doten Ave., Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April, and May, at 9:00 p.m., at the Carter Hotel, Cleveland, Ohio. R. W. Stockstill, 6545 Mayfield Rd., Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month; place irregular. William Pumpelly, 6801 Airway Rd., Dayton, Ohio, secretary-treasurer.

Fifth District Veterinary Medical Association, meetings held quarterly; time and place irregular. E. J. Kersting, 115 Sheffield Rd., Columbus, Ohio, secretary.

Geauga County Veterinary Medical Society, the third Wednesday of each month, at the Manor House, Newberry, Ohio, at 1:00 p.m. Peter J. Clemens, Jr., R. D. 2, Chagrin Falls, Ohio, secretary.

Kilbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February; place irregular. Charles Gale, Ohio Agricultural Experiment Station, Wooster, Ohio, secretary-treasurer.

Knox County Veterinary Medical Association, meetings irregular. F. O. Haberman, Centerburg, Ohio, president.

Lorain County Veterinary Medical Association the second Wednesday of April, June, October, December, and February; place irregular. G. W. Bunyan, 37200 Detroit Rd., Avon, Ohio, secretary-treasurer.

Madison County Veterinary Medical Association, quarterly; date and place irregular. James Herman, Mechanicsburg, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the fourth Tuesday of each month, at 9:00 p.m. Youngstown Maennerchor Club, Youngstown, Ohio. Robert Edwards, 25 Oriole Dr., Youngstown, Ohio.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, 1683 W. Bancroft St., Toledo, Ohio, secretary-treasurer.

Southeastern Ohio Academy of Veterinary Medicine, every other month; time and place irregular. M. S. Phillips, Athens, Ohio, secretary.

Southern Ohio Veterinary Medical Association, meetings held quarterly at Wilmington; time irregular. S. E. Peterson, 1093 Rombach Ave., Wilmington, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, 42 W. Market St., Akron, Ohio, secretary-treasurer.

Toledo Veterinary Medical Association, every other month; date and place irregular. F. C. Hartman, 3904 Rushland Ave., Toledo, Ohio, corresponding secretary.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. Fred Gunther, Springboro, Ohio, secretary.

Trumbull County Veterinary Medical Association, meet three or four times a year; time and place irregular. R. A. Hanawalt, P.O. Box 117, Kinsman, Ohio, secretary-treasurer.

West Central Veterinary Medical Association, third Thursday of February, June, September, and November, at the Lima Club, Lima, K. R. Heidt, 1055 Spencerville Rd., Lima, Ohio, secretary-treasurer.

Wheeling Valley Veterinary Medical Association, meetings held quarterly; time and place irregular. Earl Weaver, 1406 S. Zane Rd., Martins Ferry, Ohio, vice-president.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Claude A. Tigert, 3032 N.W. 68th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month at the City-County Health Building, 4616 E. 15th St., Tulsa, Okla. Arlen D. Hill, 5302 E. 11th St., Tulsa, Okla., secretary.

Tulsa Association of Small Animal Veterinarians, first and third Mondays. City-County Health Dept. R. H. Featherston, 3129 S. Winston, Tulsa 5, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m. Ireland's Restaurant, Lloyds, 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Robert J. Mallorie, P.O. Box 155, Silverton, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. John W. Dantzler, 272 Wiles St., Orangeburg, S. C., secretary.

Georgia-Carolina Veterinary Medical Association—see GEORGIA.

TEXAS—Coastal Bend Veterinary Medical Association, the third Wednesday of each month, at 8:00 p.m.; place varies. Carl A. Keller, 6103 Highway 9, Corpus Christi, Texas, secretary-treasurer.

Dallas County Veterinary Medical Association, the first Tuesday of each month at 7:30 p.m., at a place to be

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specified. Frank N. Black, 12830 Preston Rd., Dallas, Texas, corresponding secretary.

UTAH—Salt Lake Small Animal Hospital Association, the first Monday of every month, at the Holiday Inn, 3040 South State St., Salt Lake City, at 12:15 p.m. Douglas H. McKelvie, 1220 S. State St., Salt Lake City, Utah, secretary-treasurer.

VIRGINIA—Central Virginia Veterinary Association, the second Thursday of each month at 8:00 p.m., except July and August, at a place in Richmond to be announced monthly. Edwin M. Crawford, secretary-treasurer.

Northern Virginia Veterinary Conference Association, the second Tuesday of each month. T. P. Koudelka, P.O. Box 694, Harrisonburg, Va., secretary.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. D. F. Watson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 10415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Wednesday of each quarter (March, June, September, and December). E. D. Baker, 1418 LaSalle Ave., Barron, Wis., secretary.

Coulee Region Veterinary Medical Association, the third Wednesday of every other month. F. N. Petersen, Box 127, Cashton, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. All but the special meetings will be held at the Top Hat Restaurant, Middleton. Robert E. Hall, 5718 Dogwood Place, Madison 5, Wis., secretary-treasurer.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. Raymond Pahl, 10827 W. Oklahoma Ave., Milwaukee, Wis.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. L. C. Allenstein, 209 S. Taft St., Whitewater, Wis., secretary.

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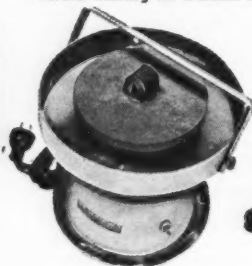


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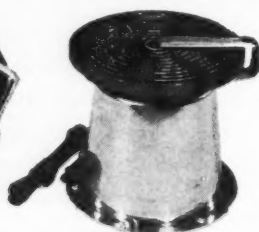
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Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. John B. Fleming, 209 E. 4th St., Marshfield, Wis., secretary.

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*Anderson, F. B.: Vet. Med. 54:535, (Oct.) 1959.

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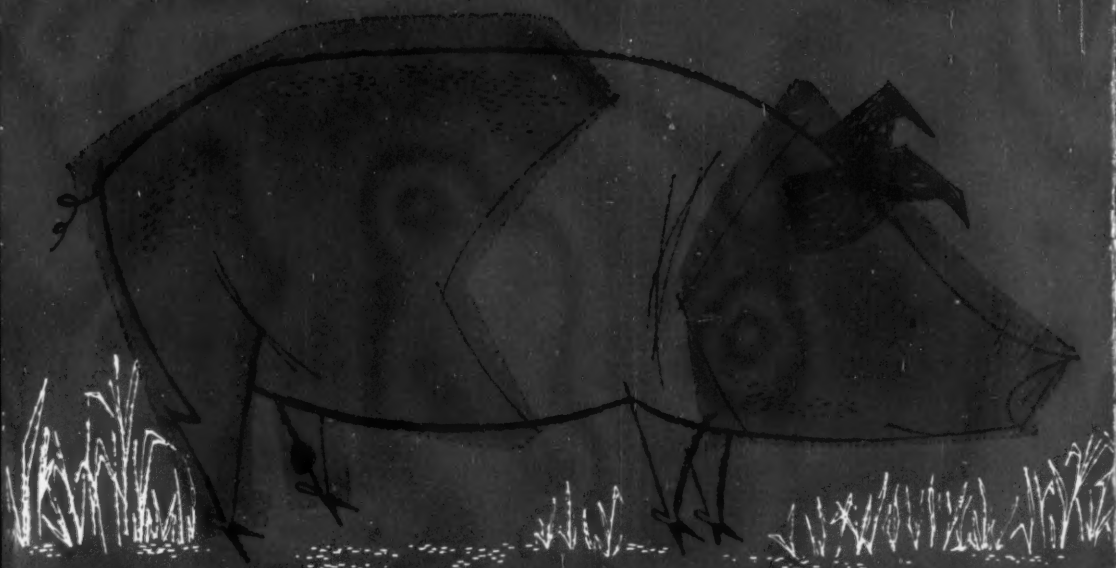
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